THE AMERICAN
School Board Journal

A PERIODICAL OF SCHOOL ADMINISTRATION

Devoted to the Interests of School Boards, Superintendents,
School-Business Officials, and School Architects

VOLUME 82
JANUARY—JUNE, 1931

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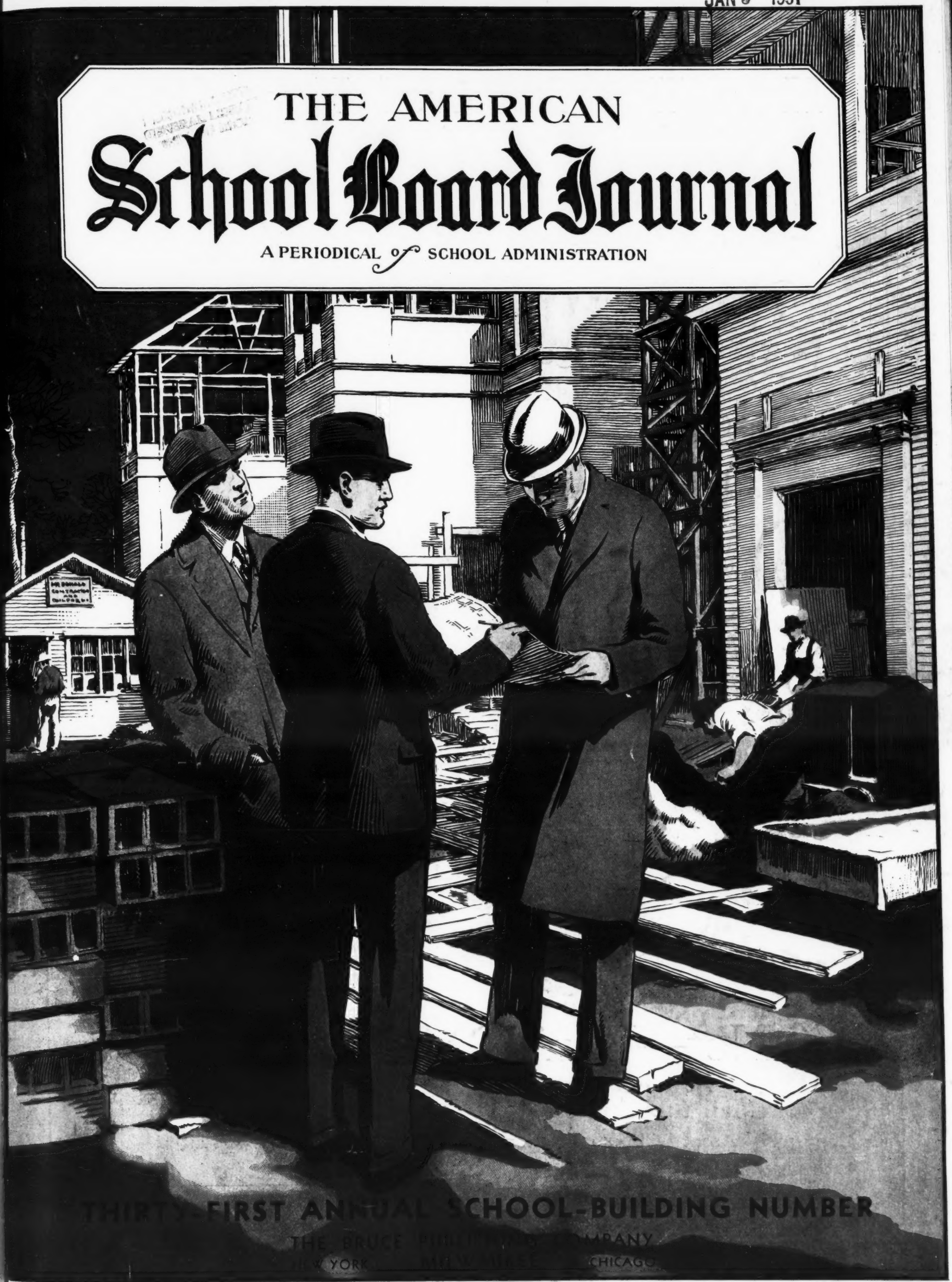

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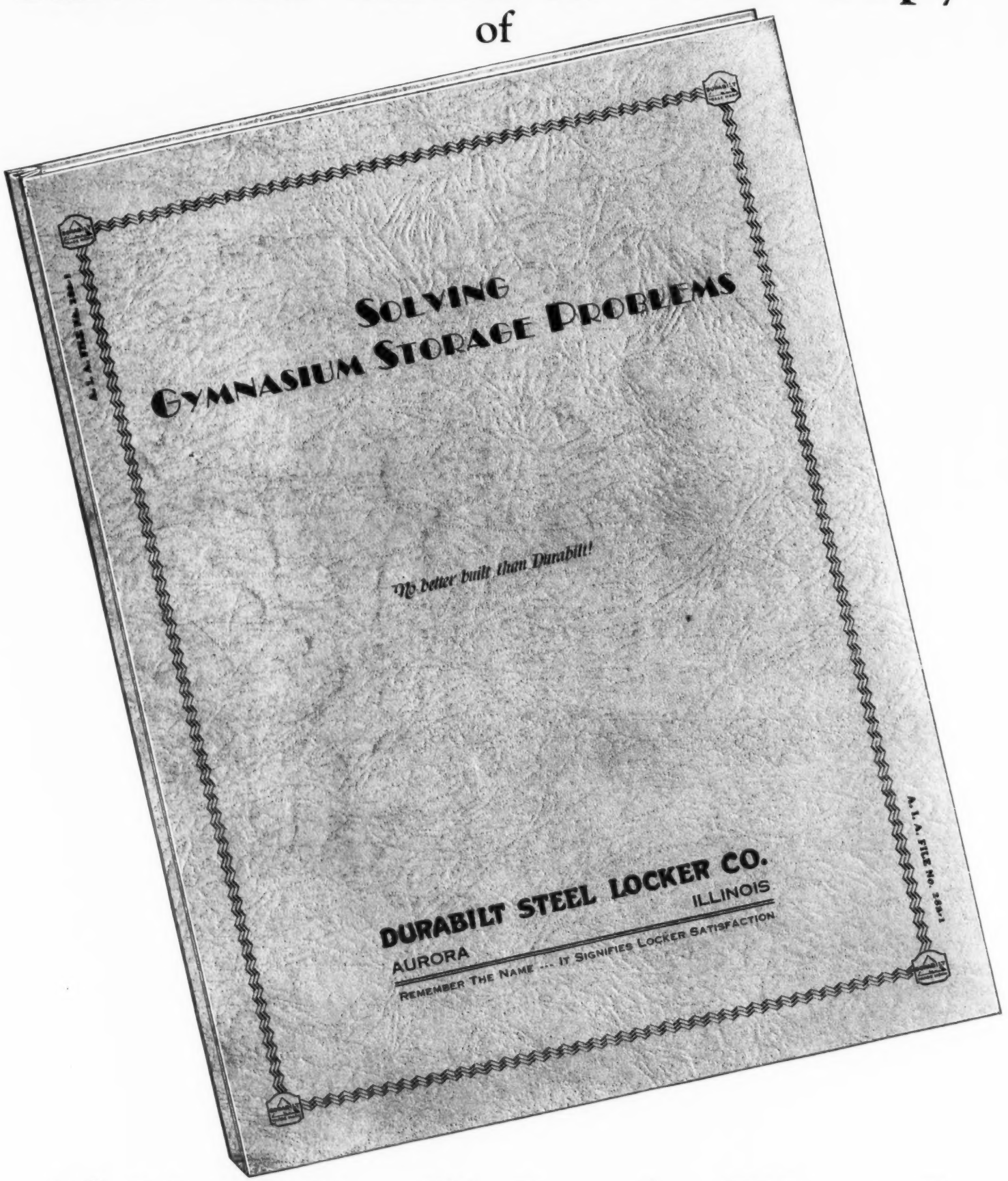

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Pyramid Natural Slate Blackboards Specified by J. C. Llewellyn, Chicago

From North to South, East to West, they clean blackboards only one way---with water. That is, the majority of them, that are natural slate. It's the right way to free the boards of chalk dust. Wipe them off dry and teachers and students must breathe dust-filled air. Wash them with water and you do the job right. But remember--only if your boards are of natural slate. There is no danger then of the surface peeling and cracking, and no fear of warped boards. This is because a natural slate board is the same right through. No thin b surface to give you trouble and expense. No surface color to fade . . . When you are proud of your school, be proud of your boards. They are the first thing you see in a classroom. Consult your architect. His recommendations are based on experience.

They Outlast the Building

"CENTURIES OF SERVICE" PYRAMID NATURAL SLATE BLACKBOARDS

NATURAL SLATE BLACKBOARD COMPANY

Pen Argyl, Pennsylvania

Von Duprin

Self-Releasing Fire and Panic Exit Latches

For the New Day

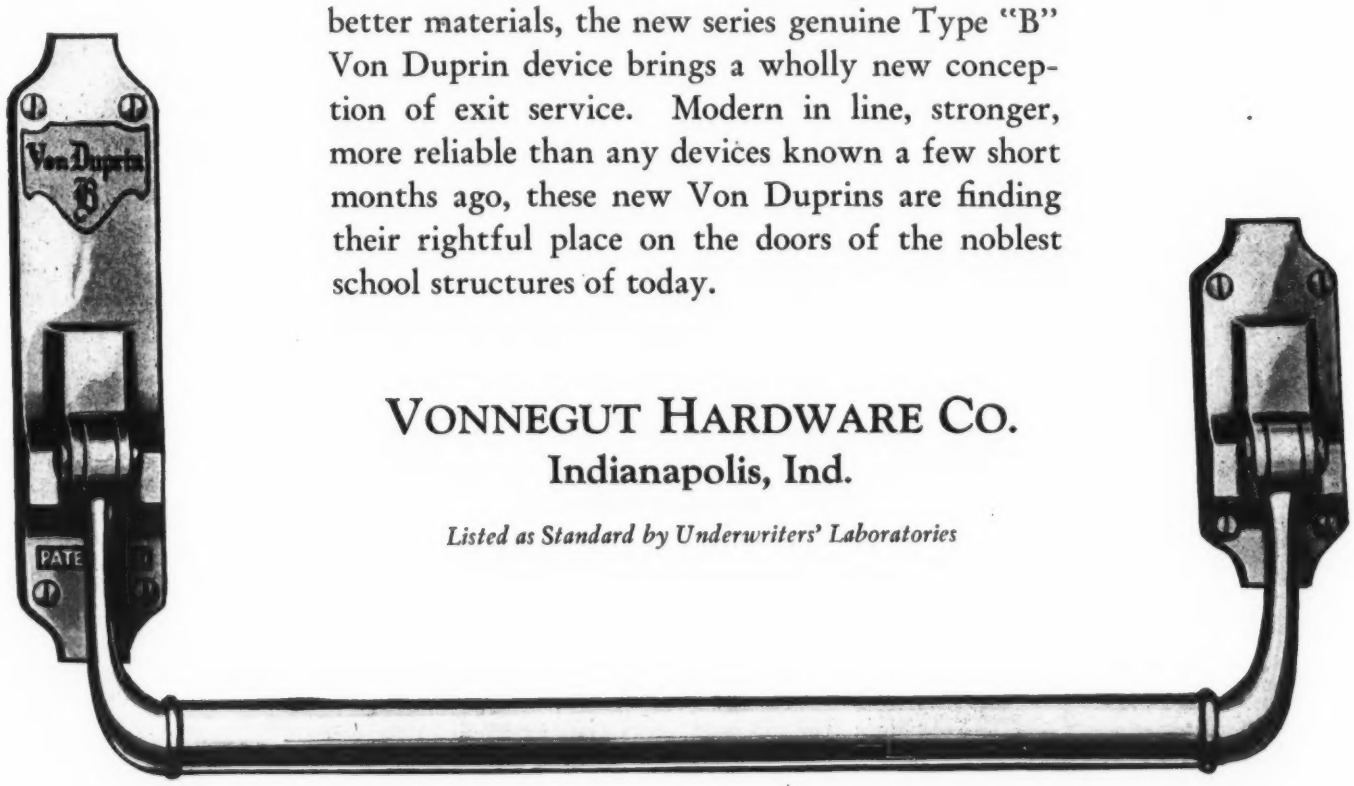
This, Sir, is the day of change.

Architectural forms and architectural materials that were good enough twenty years ago, are not always adequate now.

Sweet's
Pages C3892-C3896

Yesterday's champion may trail the pack today. And be forgotten tomorrow.

Into this age of constant searching for new and better materials, the new series genuine Type "B" Von Duprin device brings a wholly new conception of exit service. Modern in line, stronger, more reliable than any devices known a few short months ago, these new Von Duprins are finding their rightful place on the doors of the noblest school structures of today.



VONNEGUT HARDWARE CO.
Indianapolis, Ind.

Listed as Standard by Underwriters' Laboratories

KEWANEE STEEL BOILERS

Selected for the

JUNIOR-SENIOR HIGH SCHOOL

Concordia, Kansas

Modern, in every respect, Kewanee Steel Boilers were selected to heat this fine new school: Nothing less than Kewanee's well earned reputation, for dependable and efficient heat making units, being acceptable for this beautiful building.

They Burn Oil with High Efficiency

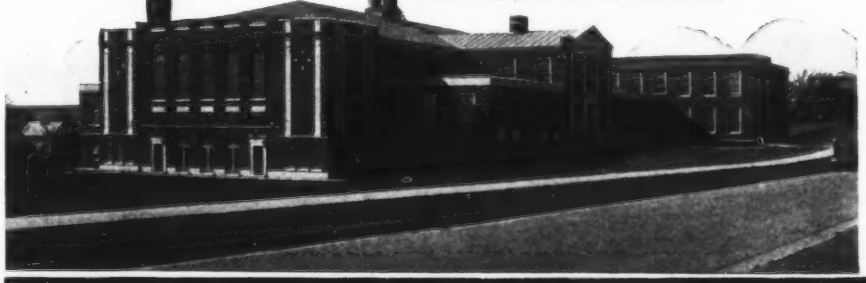
The combustion of oil produces a quick, hot fire. So an oil burning boiler must have rapid circulation to transfer efficiently the heat to the water.

Oil must be burned in a firebox of ample dimensions to permit the oil and air to mix thoroughly. And great strength is important for the sudden temperature changes put unusual stress upon the firebox.

All of these necessary qualifications are ideally met by Kewanee Steel Boilers.

Of particular interest is the Kewanee "Crown Sheet"—*corrugated and "right-side-up."* This design adds strength and provides a greater area of heating surface directly in contact with the most intense heat in the firebox.

Noteworthy among Modern Schools is this $350,000 building designed by PROUDFOOT, RAWSON, SOUERS & THOMAS of Des Moines. The 2 KEWANEE Steel Boilers installed by SALINA PLUMBING CO. have a rated capacity to heat 29,400 feet of radiation.



More than 5000 of America's Finest schools are heated with Kewanee Boilers. Our book—"Kewanee in Service" (School Edition) with its accompanying list, will interest any school board that contemplates building. ASK FOR IT.

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MEMBER OF STEEL HEATING BOILER INSTITUTE

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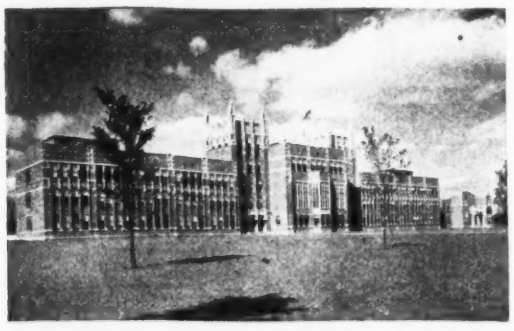
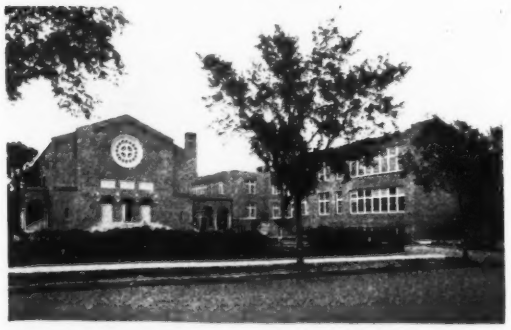
SENIOR HIGH SCHOOL—Bowling Green, O.—S. P. Stewart & Son, *Arch.*; Robert Kell, *Plbg. Contr.*



TOWNSHIP HIGH SCHOOL—Evanston, Ill.—Hamilton, Fellows & Nedved, *Arch.*; A. K. Brown, *Plbg. Contr.*



ST. THOMAS SCHOOL—Minneapolis, Minn.—W. K. Vanderbilt, *Arch.*; M. J. McGrath, *Plbg. Contr.*

WEST JUNIOR HIGH SCHOOL—Lansing, Mich.—J. N. Churchill, *Arch.*; Craig & Daly, *Plbg. Contr.*

These five schools are typical of the more than 5,000 modern schools throughout the country that have modernized their toilet rooms and plumbing equipment with Clow Specialized Fixtures.

No Classrooms

To these ghostly *professors* a toilet room is a classroom, a plumbing fixture, a rostrum to spread trouble, insanitation, high costs, disease and dirt.

For more than fifty years the Clow Soldier of Sanitation has been fighting to oust this *faculty* from every school in the land.

To make this aim a fact, the Clow Soldier of Sanitation has developed the longest line of specialized school plumbing fixtures in the world.

C L

Consult your architect

PREFERRED FOR EXACTING

for this Faculty

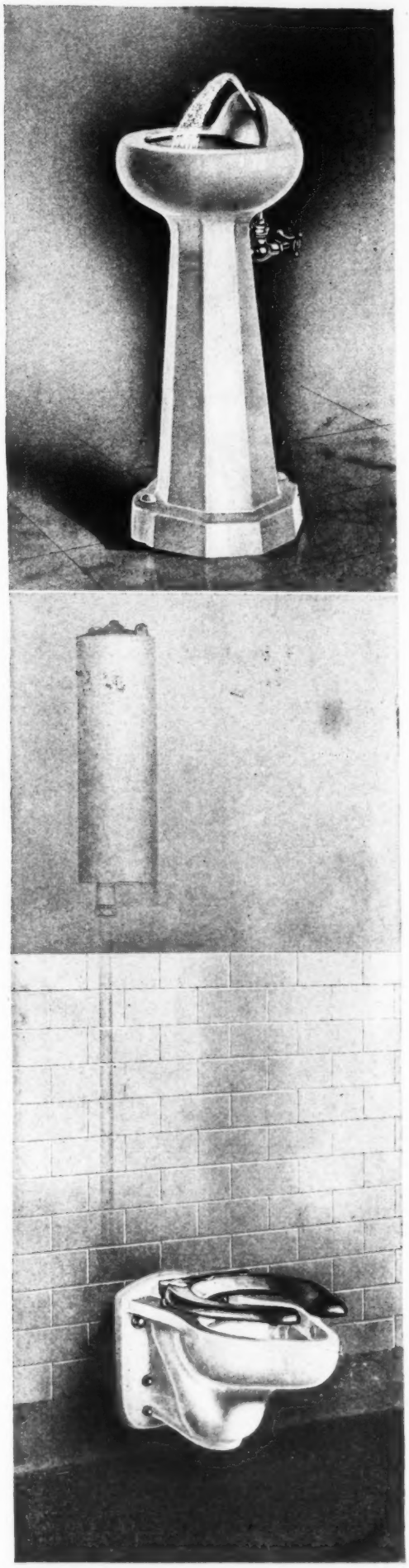
He has pioneered drinking fountains that are positively sanitary and foolproof, closets that flush themselves, closet bowls that fit children, and other highly specialized items.

He has developed materials, construction and manufacturing technique to defy a lifetime of hard school usage.

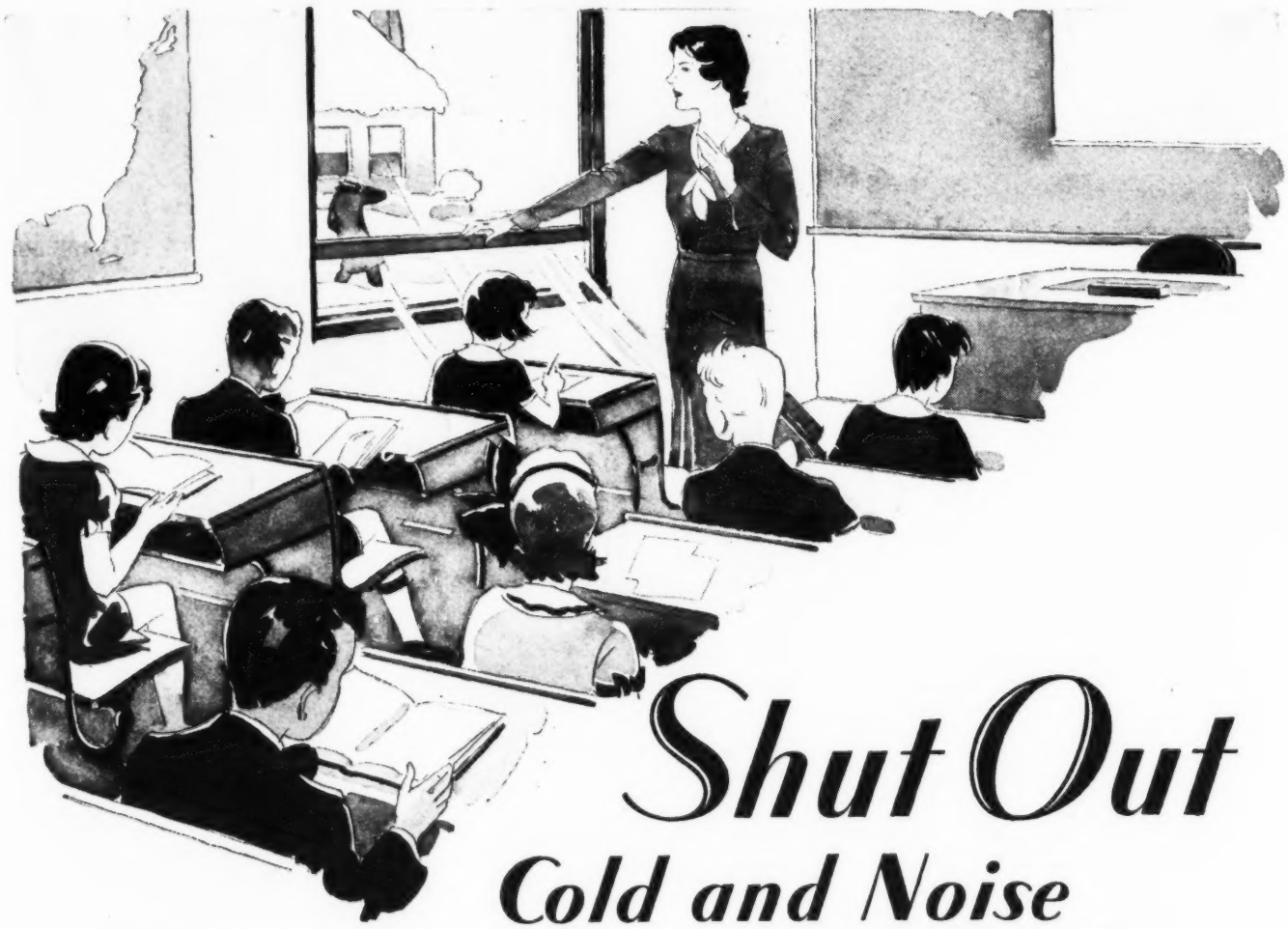
He stands ready to help school boards, architects and plumbers get the plumbing that will prove most economical over a period of time.

O W

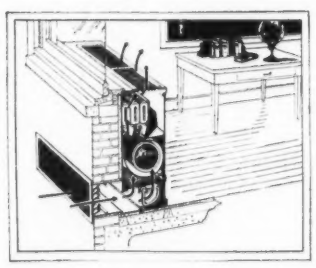
CHICAGO
PLUMBING SINCE 1878



Here are two members of the most complete line of specialized school plumbing fixtures in the world. Above: a Clow angle-stream, pedestal-type drinking fountain. Below: a Clow-Madden, wall-hung closet — after every occupation it flushes itself. The complete line of Clow fixtures is shown in Catalog No. 50. Ask for a copy.



Shut Out Cold and Noise and Drafts...



OUTDOORS...2° below, with wet snow flying before a biting wind! Windows must be shut against the weather. They can be *kept* shut, if there are Sturtevant Unit Heater-Ventilators to keep the classroom comfortable and healthful.

In the morning, Sturtevant Unit Heater-Ventilators will warm up the classrooms quickly...much more quickly than direct radiation. Then during classes they will draw in outdoor air ...filter it...temper it...and circulate it through the room... gently, quietly, thoroughly. Free from discomfort and distraction, teachers and students can do better work.

Throughout the country, schools both old and new have proved for themselves the advantages of Sturtevant Unit Heater-Ventilators. Full information will be sent you...for the asking...from our nearest office.

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Junior-Senior High School Building

CONCORDIA, KANSAS

Has Johnson Dual System of Temperature Control

All of the direct radiators and ventilating units in this building are controlled by Johnson dual thermostats which operate these heat sources to maintain an even, normal temperature during the day and by means of a switch under the control of the engineer are adjusted to automatically operate them at a lower temperature during the night or when rooms are unoccupied. The use of this dual thermostat produces a valuable fuel economy and a flexible use of the heating and ventilating system as it prevents unnecessary heating at night and in unoccupied rooms and at the same time provides perfect temperature control when rooms are occupied. All fresh air intake, recirculating and exhaust ducts are provided with Johnson dampers which are operated by pneumatic switches under control of the engineer, thus permitting the engineer to ventilate the building by opening the dampers during the occupied periods and hermetically sealing the building to save heat by closing these dampers when ventilating is not required during the unoccupied periods.

Proudfoot, Rawson, Souers & Thomas, Des Moines, Iowa, Architects.

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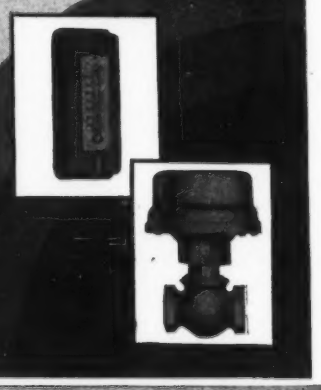
Each Johnson Installation Made By Johnson Mechanics Only.

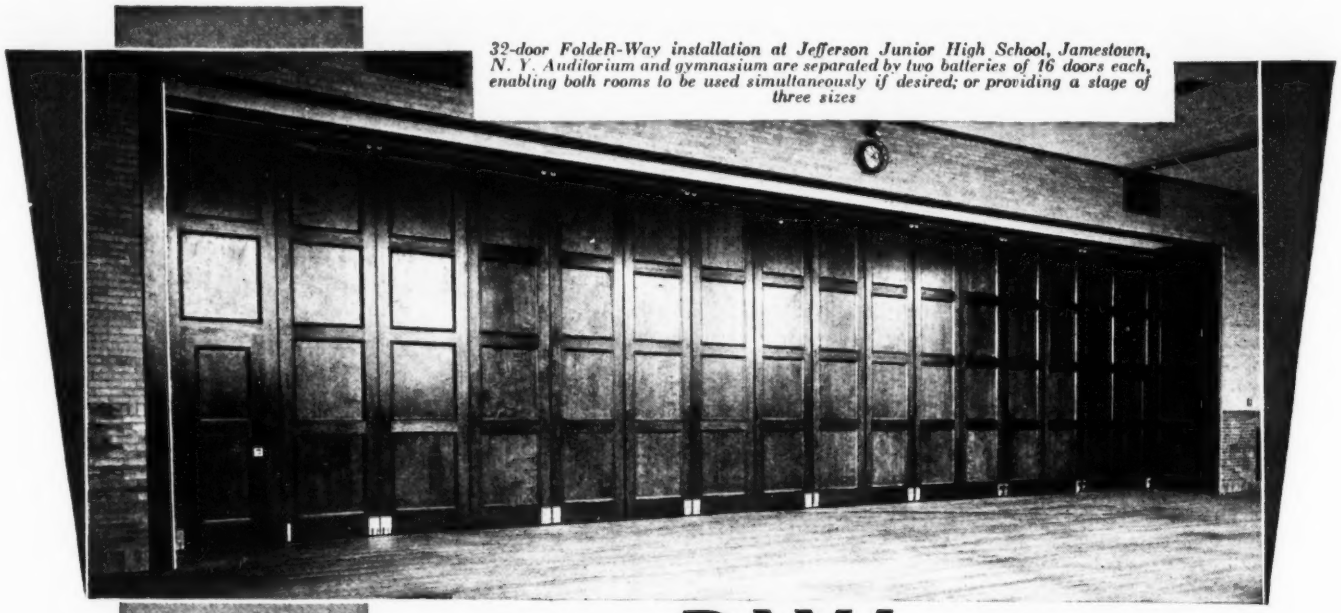
Every Johnson Installation Inspected Annually Without Charge. . . .

30 Convenient Johnson Branches Insures Emergency Attention Within 24 Hours Anywhere.

The All-Metal System. The All-Perfect Graduated Control of Valves & Dampers. The Dual Thermostat (Night & Day) Control: Fuel Saving 25 to 40 per cent per year.



JOHNSON HEAT AND HUMIDITY CONTROL



32-door FoldeR-Way installation at Jefferson Junior High School, Jamestown, N. Y. Auditorium and gymnasium are separated by two batteries of 16 doors each, enabling both rooms to be used simultaneously if desired; or providing a stage of three sizes

FoldeR-Way doors are Standard Equipment for Schools

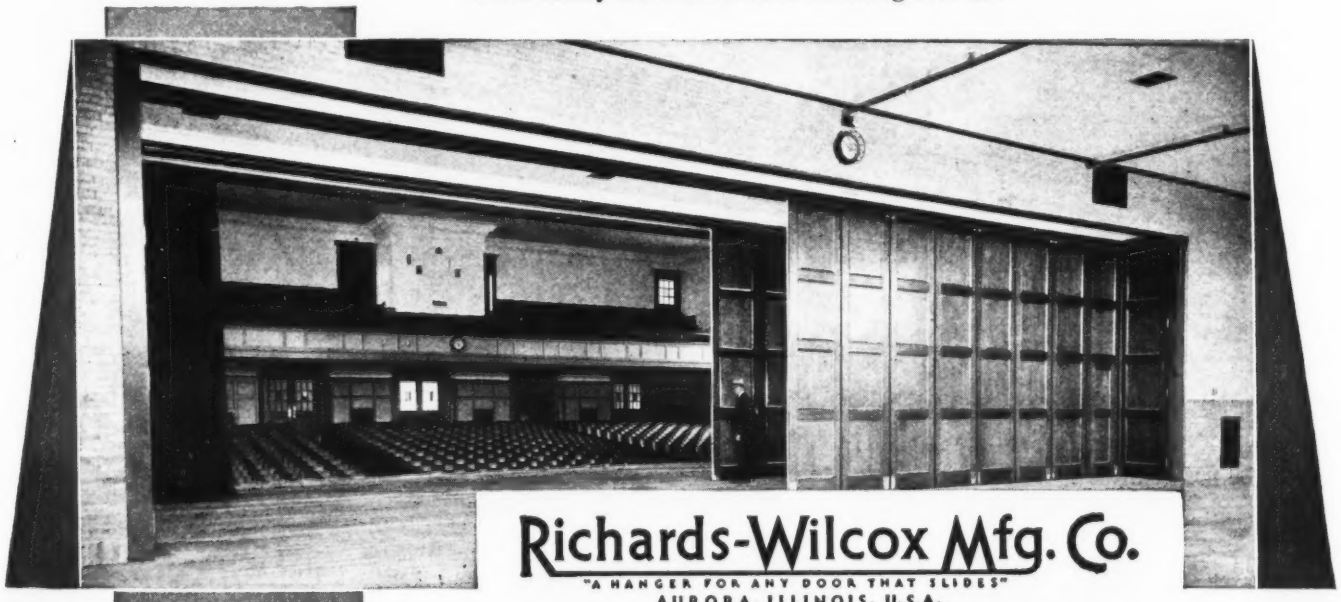
Wherever they need large openings and disappearing partitions, the specifications should call for R-W FoldeR-Way equipment. The bigger the opening, the greater the need for FoldeR-Way partition doors. So imperative are silence and smooth, easy, trouble-free operation that nothing less efficient than FoldeR-Way equipment is either practical or economical.

R-W school equipment includes school wardrobes of every size and design; hardware for every door that slides; and R-W Compound Key Veneered Doors, specially manufactured for FoldeR-Way installations.

Consult an R-W engineer about any doorway problem. Send today for illustrated Catalog No. 43.

The beauty and smooth operation of R-W Compound Key Veneered doors are lasting. Sagging, warping, swelling, shrinking are practically eliminated by tongue and groove method of applying veneer. These famous doors are now made exclusively and sold only by R-W for FoldeR-Way partitions

over 50 years 1880/1931



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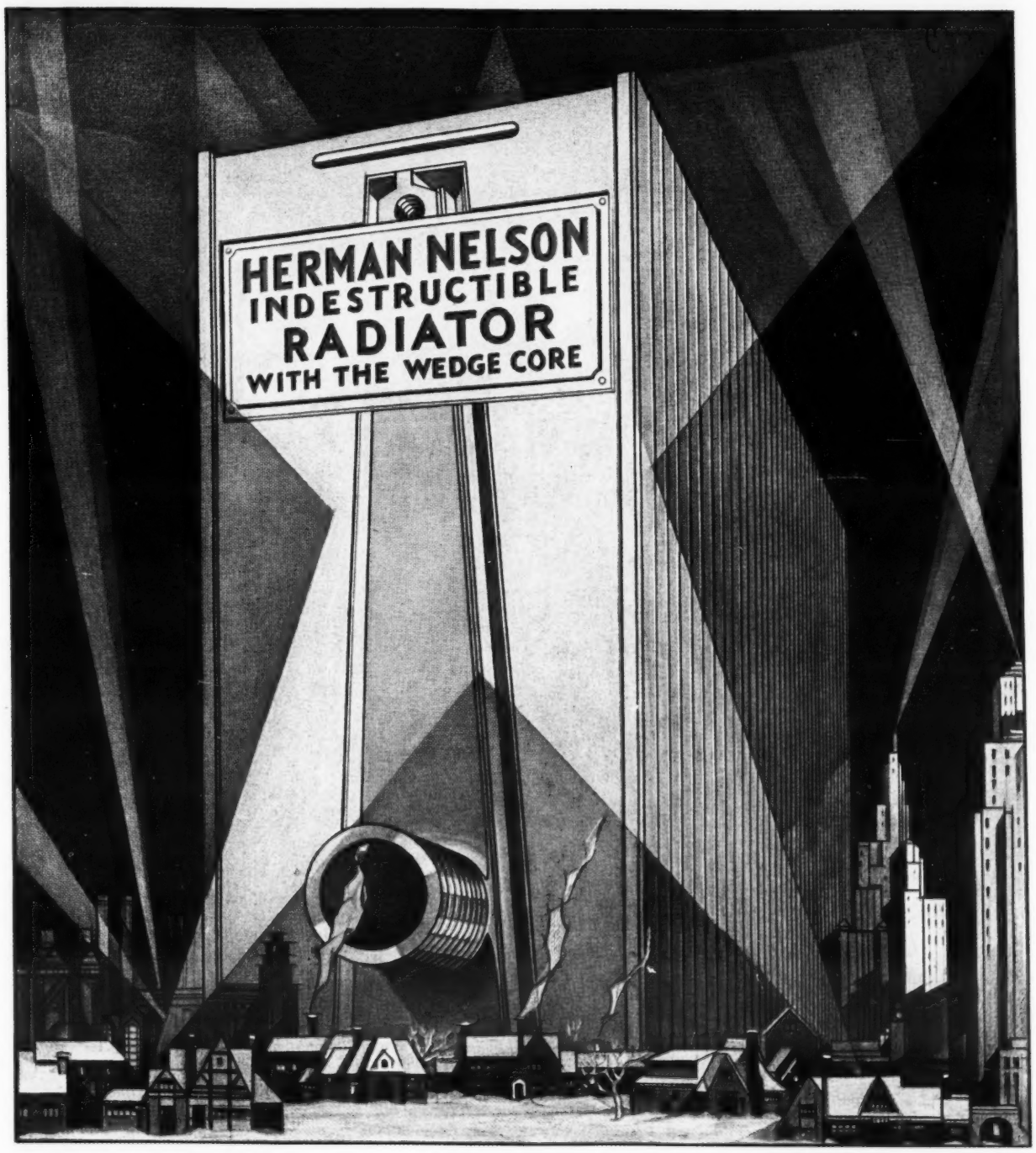

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The Herman Nelson Wedge Core Radiator is an exclusive feature of all Herman Nelson Heating and Ventilating Products and accounts for their satisfactory performance. + + + +

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The UNIVENT is the connecting link...

between outdoors and indoors

hink of a school room flooded with health giving nvigorating mountain air. Can you think of any tmosphere more ideal for fitting the coming men nd women of America to meet their future respon-ibilities as leaders of our nation?

We can't, of course, bring the mountains to our chools, nor our schools to the mountains, but e can give our school children in any school nywhere, the benefits of the great out-of-doors through Univent Ventilation.

Look at the happy, healthy children in the illustration. The photograph is f a Univent Ventilated school room taken in 1924, and from this same Illinois chool, each year the Univent is producing similar specimens.

The Univent brings into the room, outdoor air, cleans it, tempers it and distributes it to each occupant of the room with gentle invigorating air motion—but without drafts.

School executives who adopt Univent Ventilation are fulfilling one of their greatest responsibilities to the children of their community. In addition they are meeting their pledge to the tax payers by investing in a ventilating system that effects great savings in operating and maintenance cost.

Consult your architect, engineer or our nearest sales office about the Univent. If you prefer, write for our illustrated book, "Univent Ventilation."

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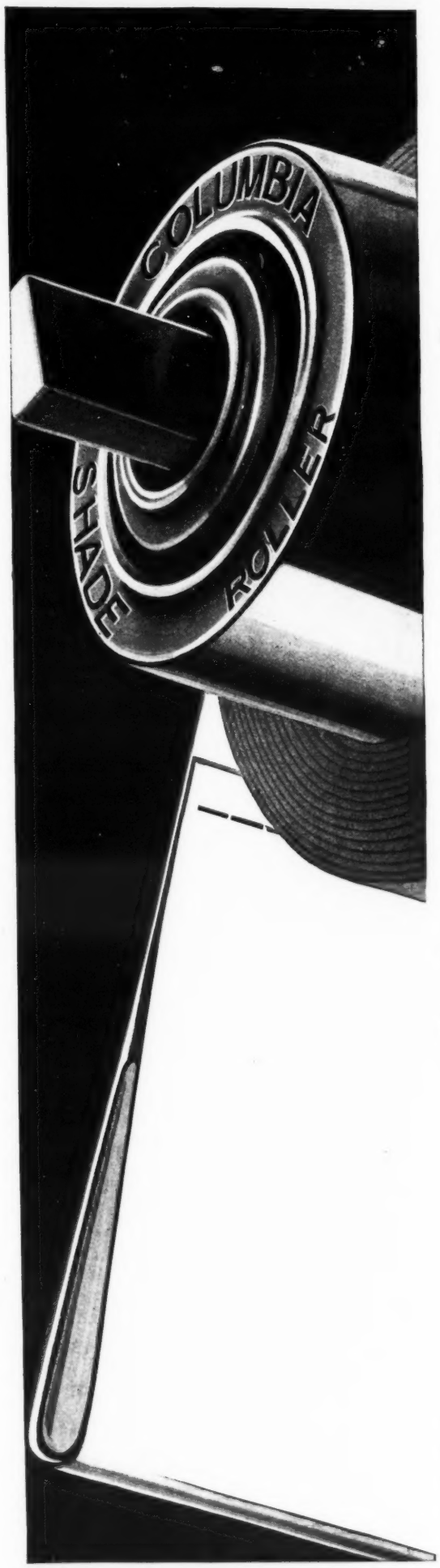
* Makers of the *Univent*, for the ventilation of schools, offices, churches and all buildings having an acute ventilating problem—the *Herman Nelson Invisible Radiator*, for residences, apartments, hotels, offices and monumental structures—the *Herman Nelson hi Jet Heater*, for economical distribution of heat in factories, mills, garages, warehouses, and smaller buildings.



Be Hard-boiled

about Window Shades

Don't be easy-going when you buy window shades. Be hard-boiled about it. You'll save money that way, for all window shades are not alike. There is one to suit your needs at a lower cost per year than any other.

Go after that one. Make the man who claims he has it *prove* it. If he is showing *Columbia* shades, he *has* the proofs and likes to show them.

Real merit in a window shade goes deep. It's in the cloth; tucked away in the heart of the roller. The real savings you can make are tomorrow's, not today's—troublefree service; negligible upkeep.

Get these merits and savings. Look for them in *Columbia* shades. Be savage about it. See *why* the shading is better . . . in its raw materials and its expert making. Pull a *Columbia* roller apart. Know *why* it is noiseless, rustless, lastingly efficient. See for yourself its overpowered spring. Ask what buildings *Columbia* shades have proved themselves in . . . ask how well and at what cost.

***Columbia* makes the finest window shades. We welcome the hard-boiled buyer . . . he will learn *how* fine they really are!**

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Rollers · Venetian Blinds

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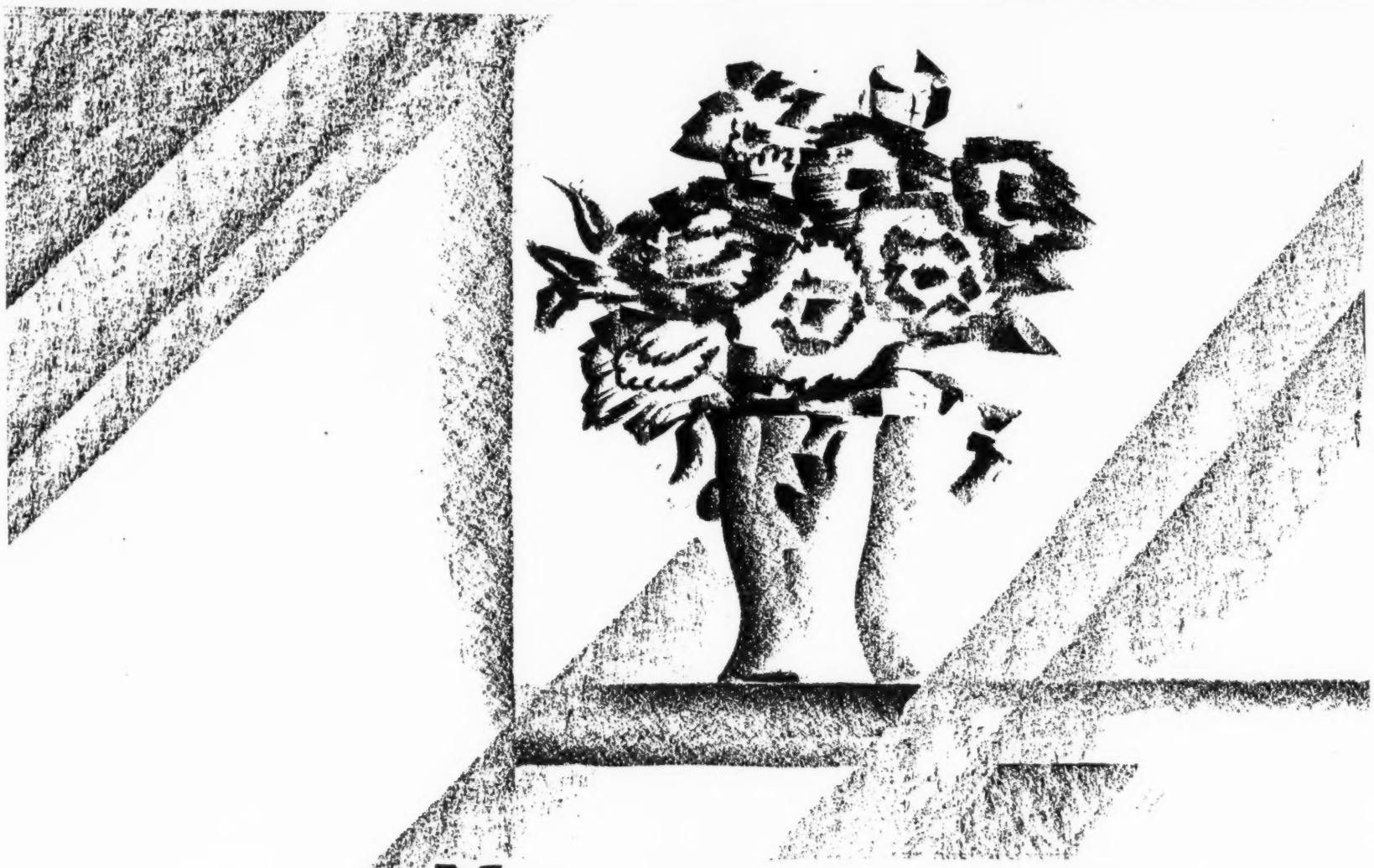


You can't keep dust out of a school . . .

It is tracked in—comes in through windows and is produced in volumes by blackboards and other normal school activities.

But you can remove dirt and dust soon as it arrives.

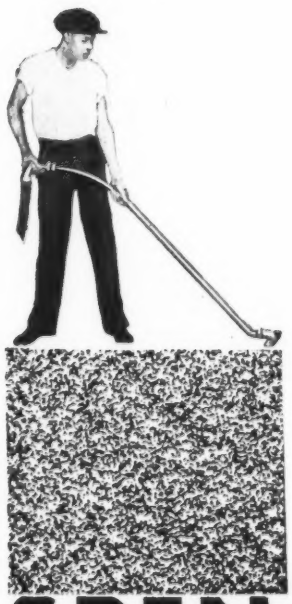
The Spencer System

cleans the main avenues of travel quietly and quickly during the opening exercises.

The biggest cause of dust is thus removed at its source. Rooms are cleaned while vacant or between periods if necessary and the whole school is given a perfect cleaning every day without heavy labor costs.

The Spencer System is not only the most economical method of cleaning; it is the only method that will clean thoroughly according to tests made by experts in school cleaning and maintenance.

Let us send you the Bulletin and a list of Spencer Equipped Schools.



The Spencer Turbine Company, Hartford, Conn.

SPENCER CENTRAL CLEANING SYSTEM

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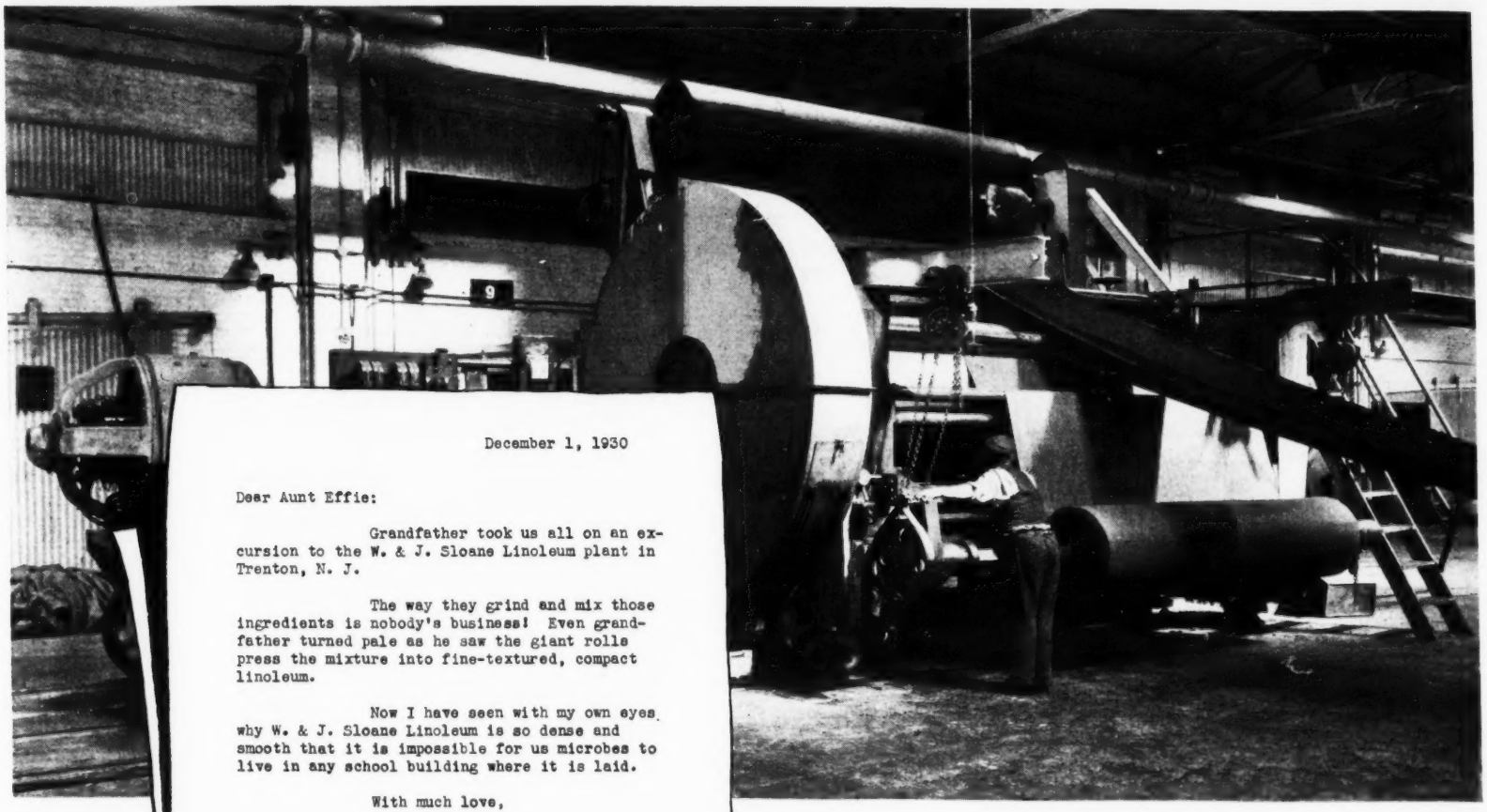


December 1, 1930

Dear Aunt Effie:

Grandfather took us all on an excursion to the W. & J. Sloane Linoleum plant in Trenton, N. J.

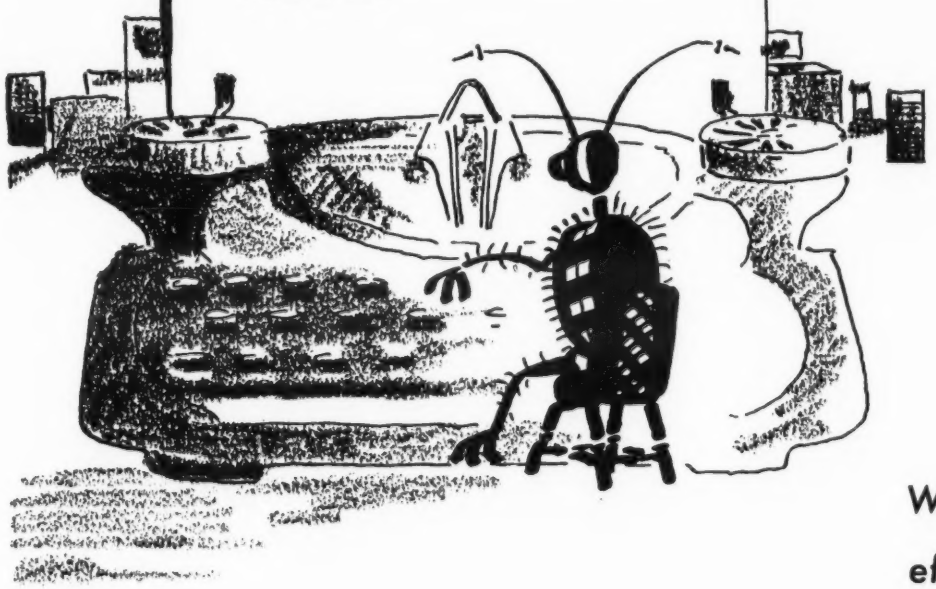
The way they grind and mix those ingredients is nobody's business! Even grandfather turned pale as he saw the giant rolls press the mixture into fine-textured, compact linoleum.

Now I have seen with my own eyes why W. & J. Sloane Linoleum is so dense and smooth that it is impossible for us microbes to live in any school building where it is laid.

With much love,

Willie Microbe

P. S. The School Board has just ordered W. & J. Sloane Linoleum for No. 9 School. We are moving at once.



The giant calender in the W. & J. Sloane Plant is the largest in the world. In a single operation it presses the ingredients uniformly in texture, density and thickness on to a strip of burlap to form, except for seasoning, trimming and inspection, finished linoleum.

W. & J. Sloane Linoleum is especially effective against microbes. Extra grinding of ingredients plus 32% extra pressure in the calender rolls gives W. & J. Sloane Linoleum a uniform texture without cracks and crevices. Double-waxing at the plant adds a super-smooth finish, making it possible to use the linoleum as soon as laid. School officers and members of school boards will find in our comprehensive book: "Linoleum—What It Is—How It Is Made in the W. & J. Sloane Plant" many other reasons—sanitary, economic and decorative —for using W. & J. Sloane Linoleum. We will gladly send you a copy on request. Address Advertising Department, W. & J. Sloane, 577 Fifth Avenue, New York.

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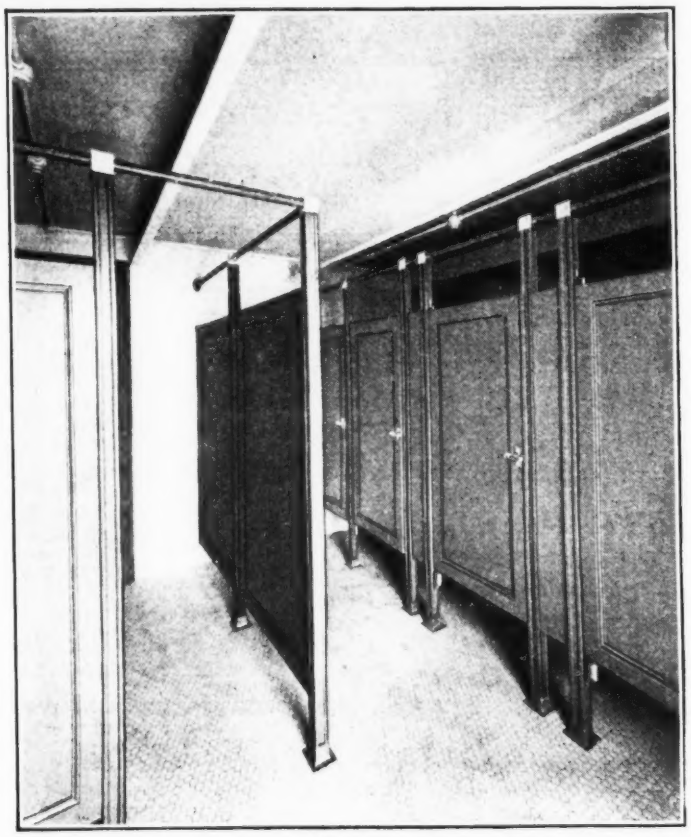

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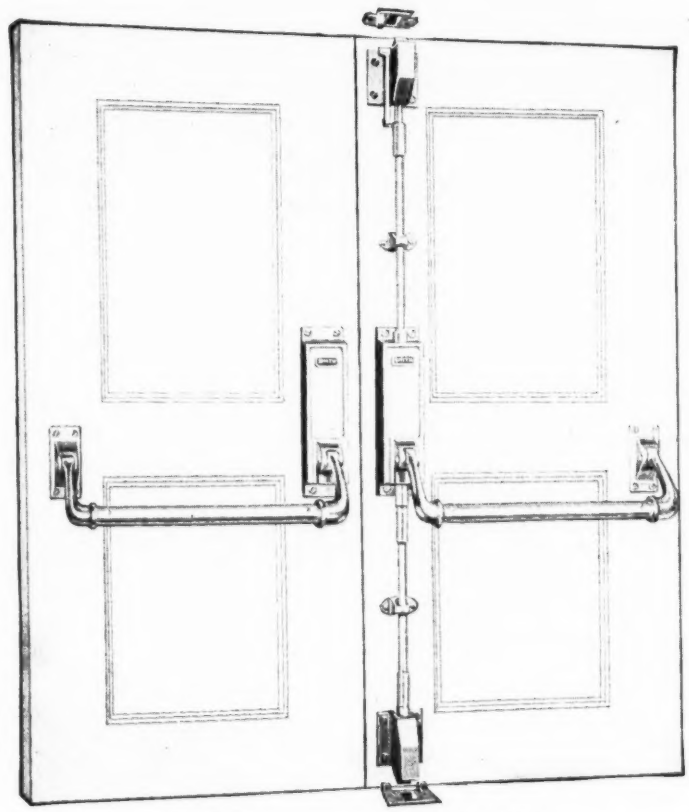

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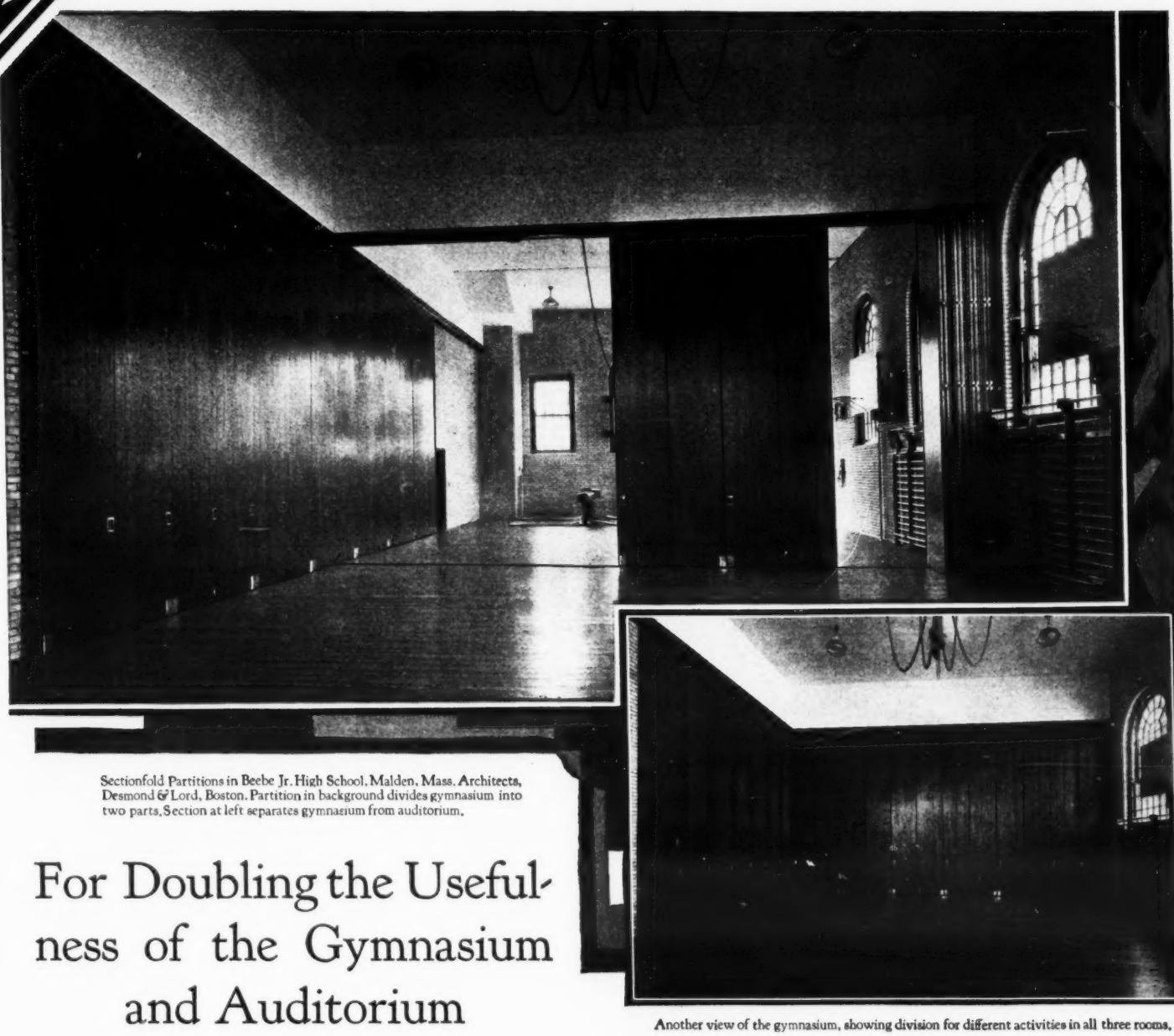

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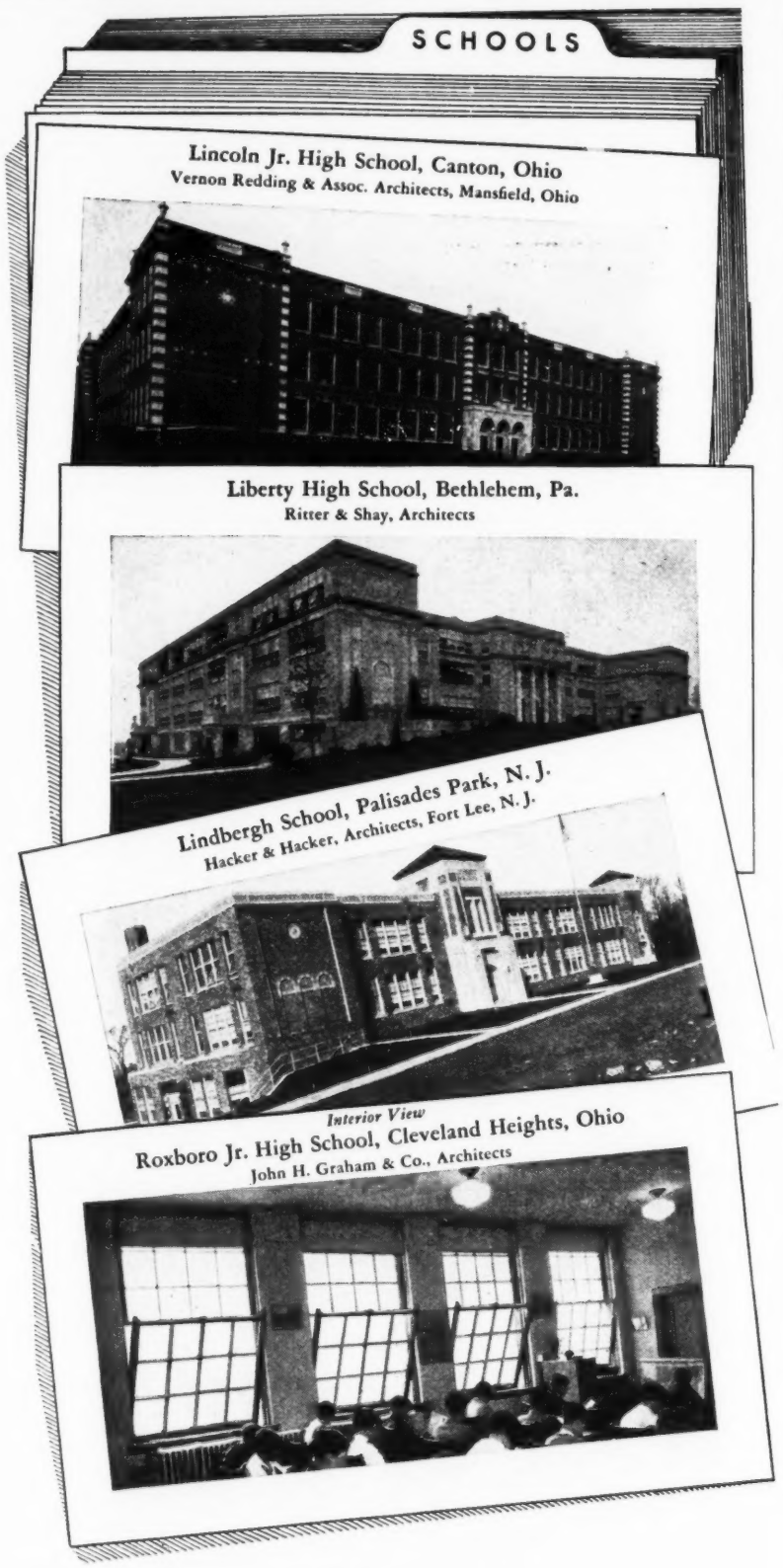
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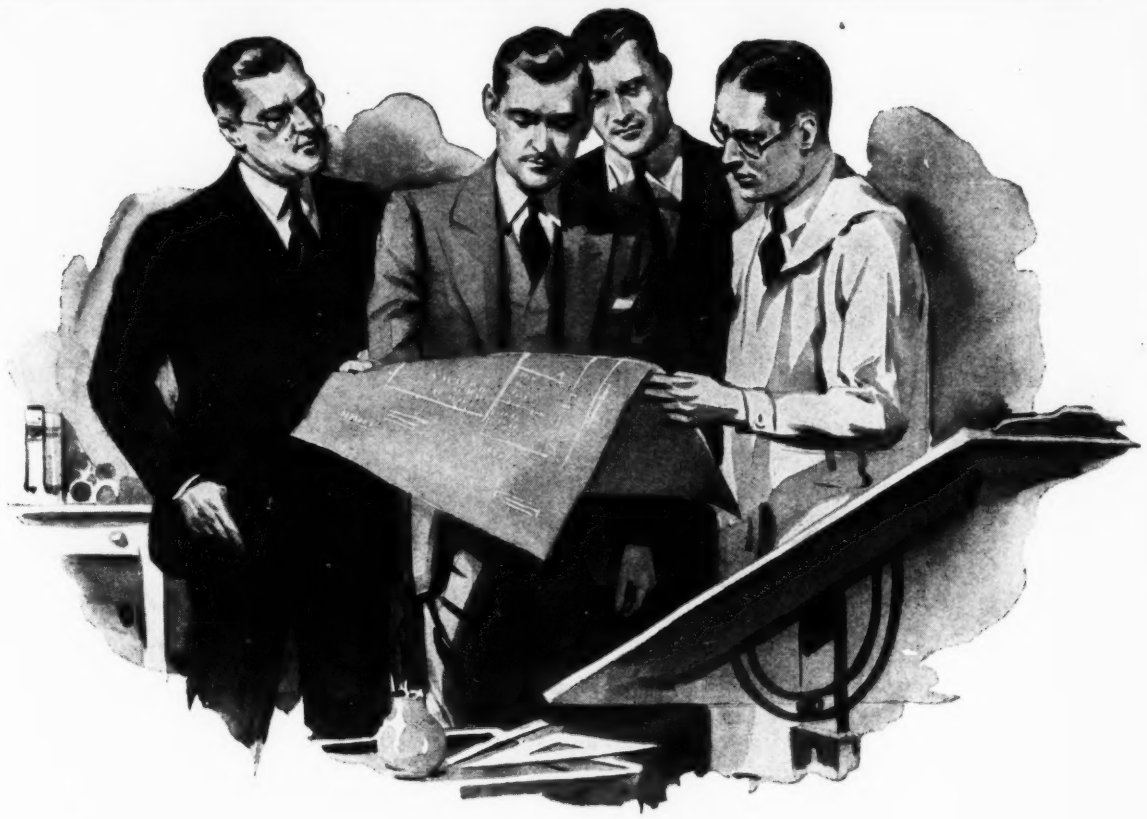

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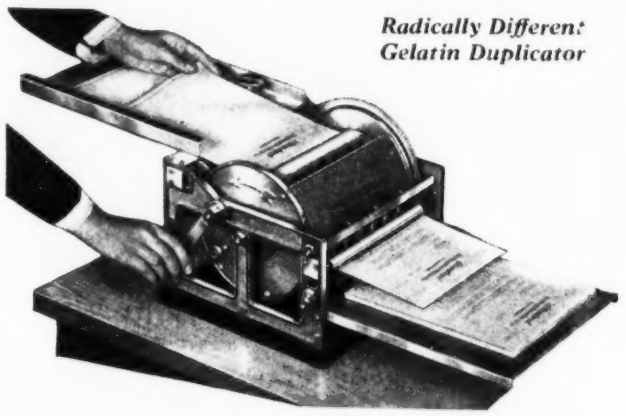

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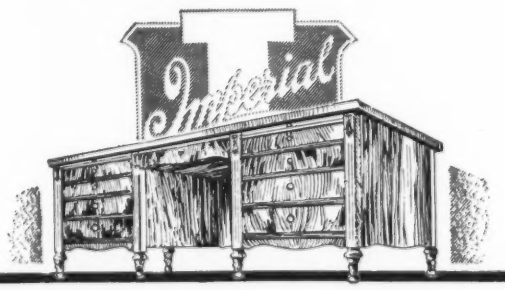

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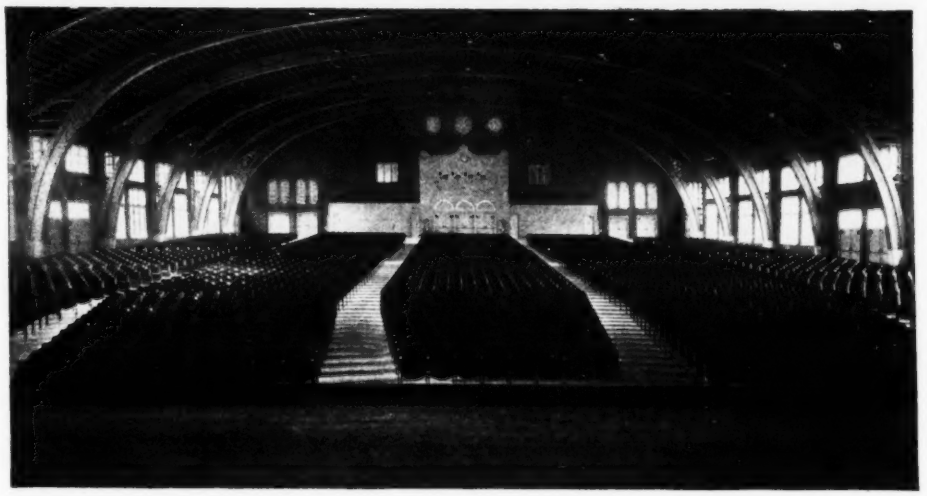

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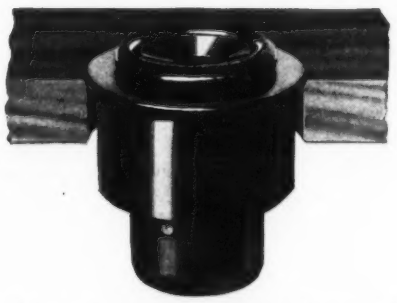

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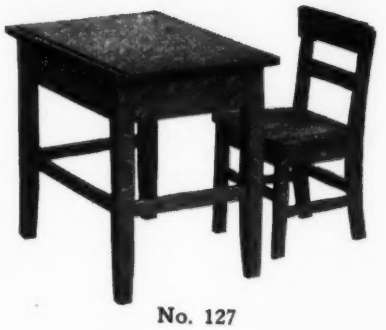

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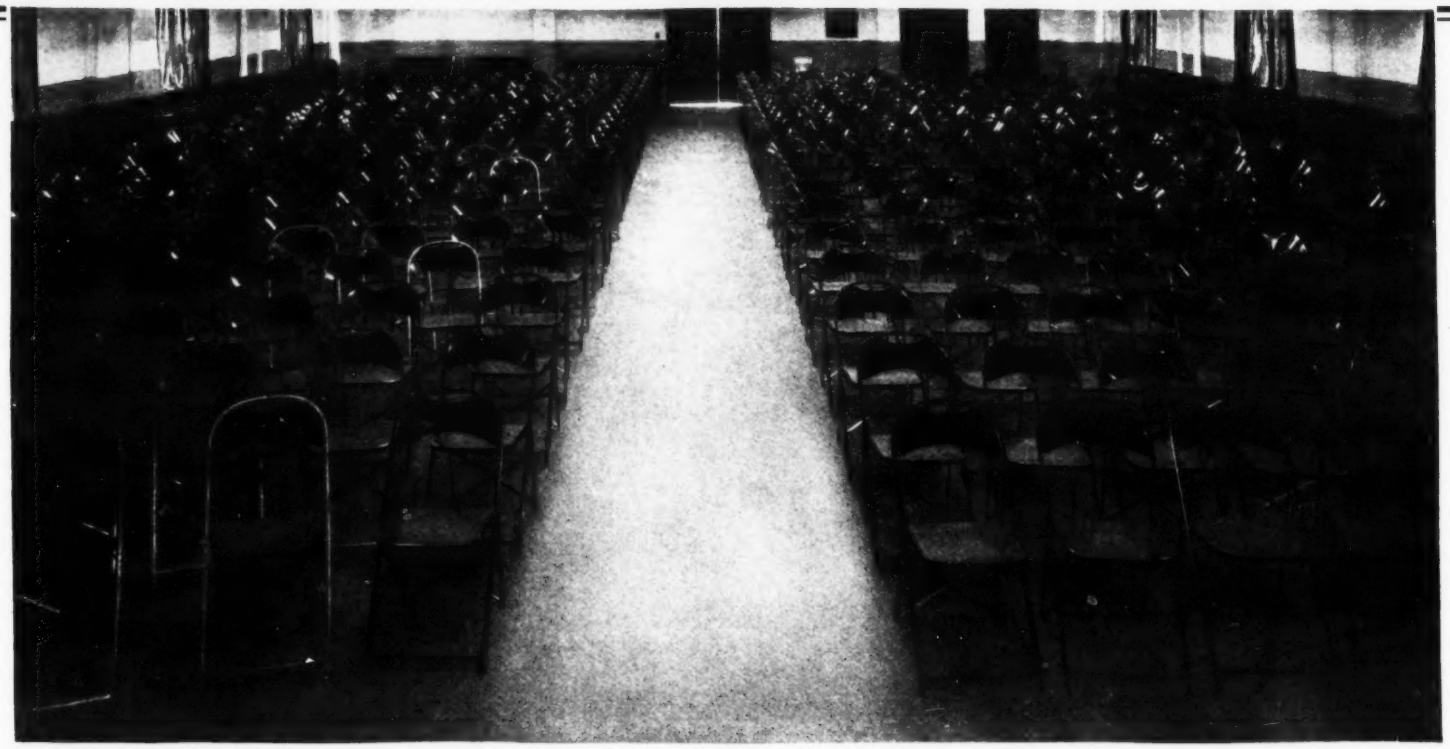

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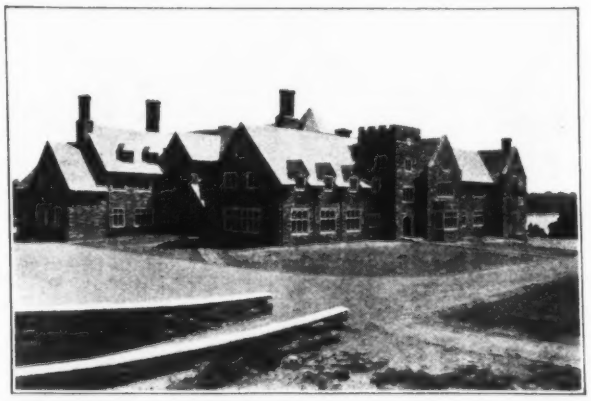

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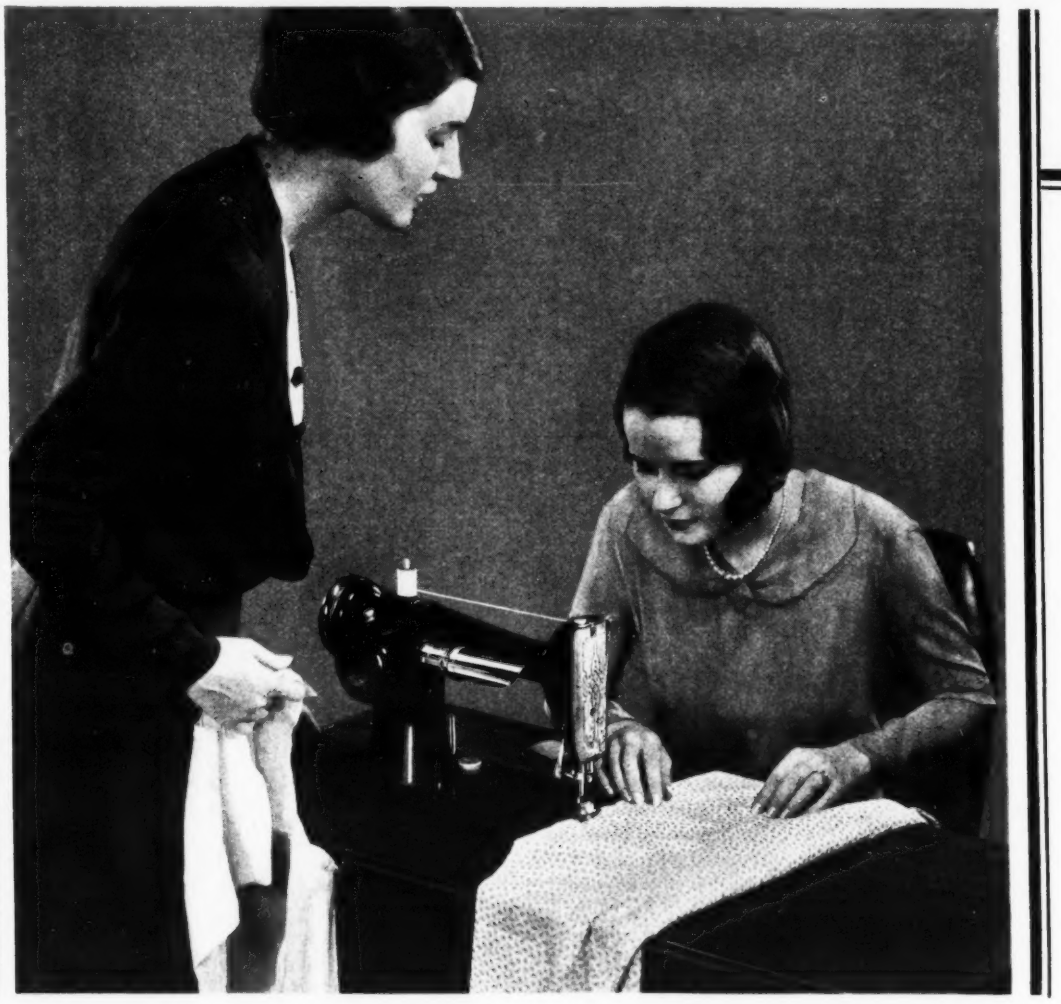

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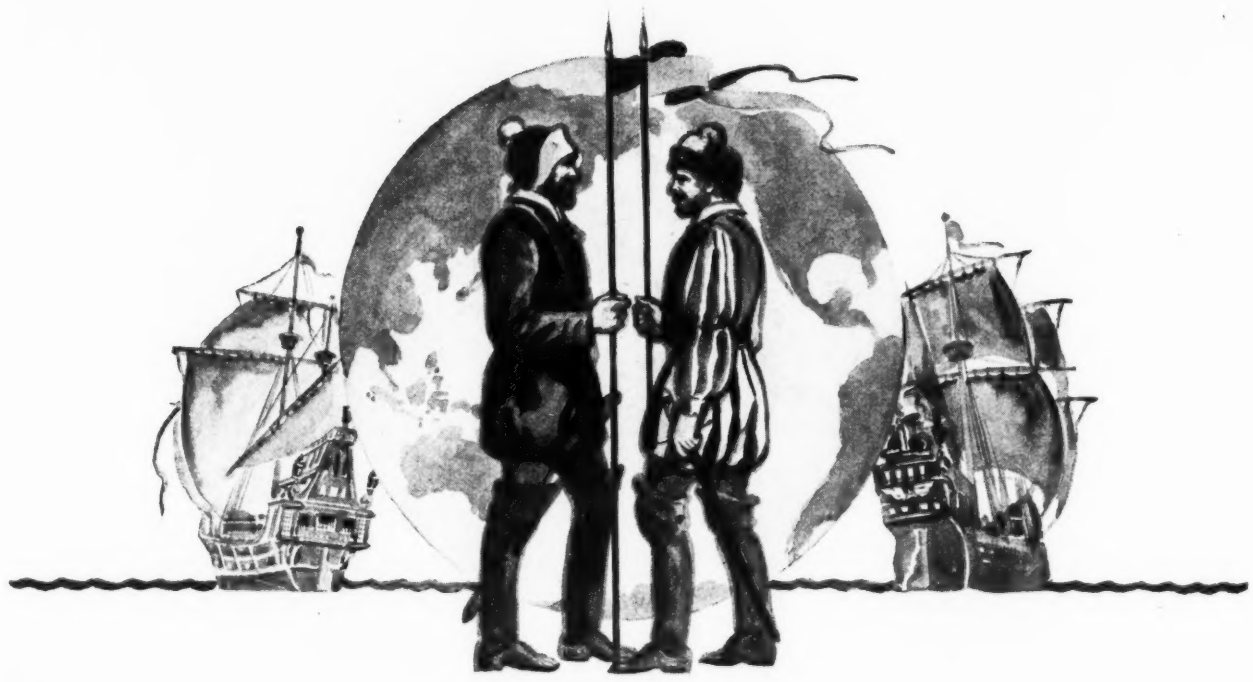

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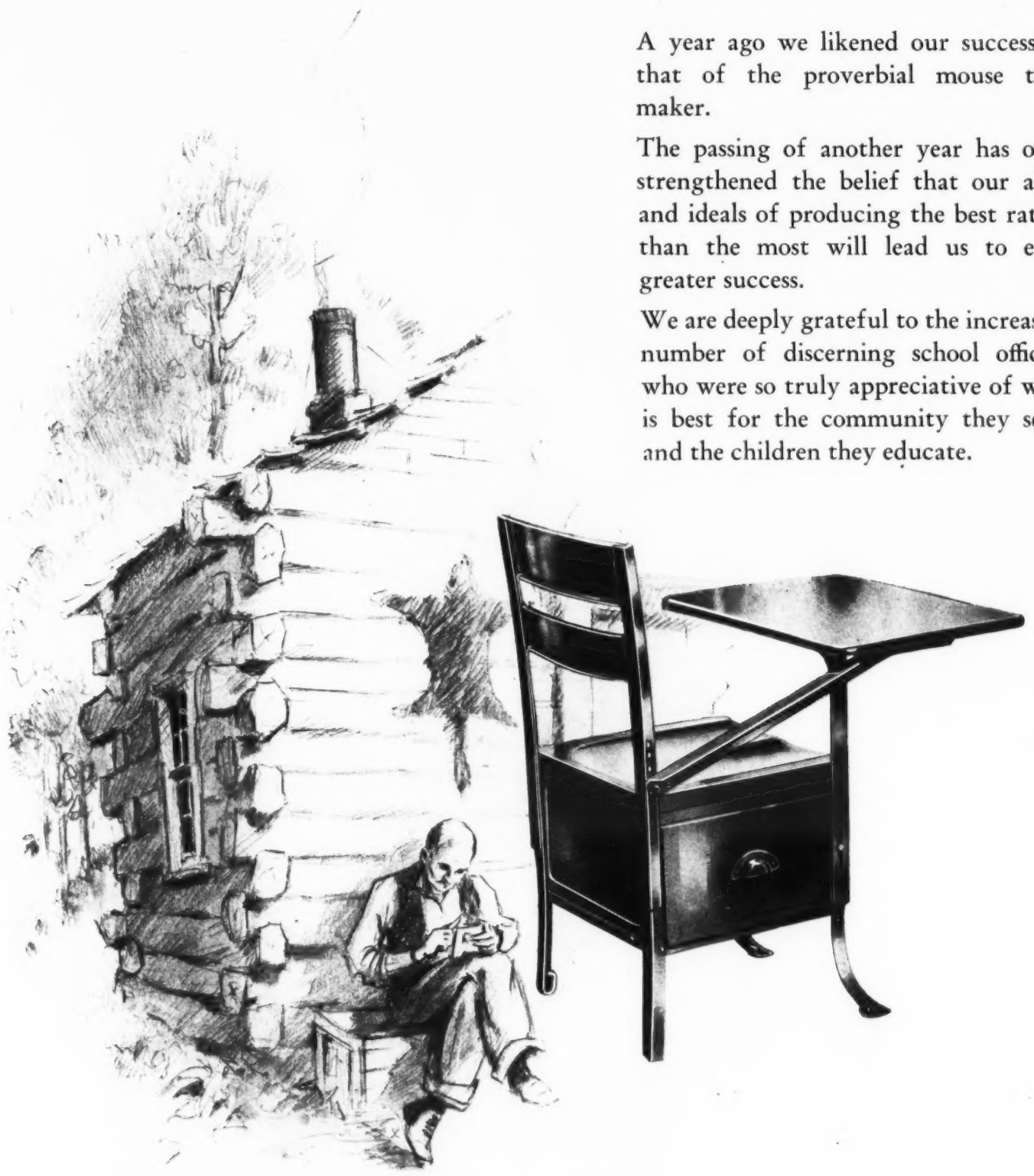

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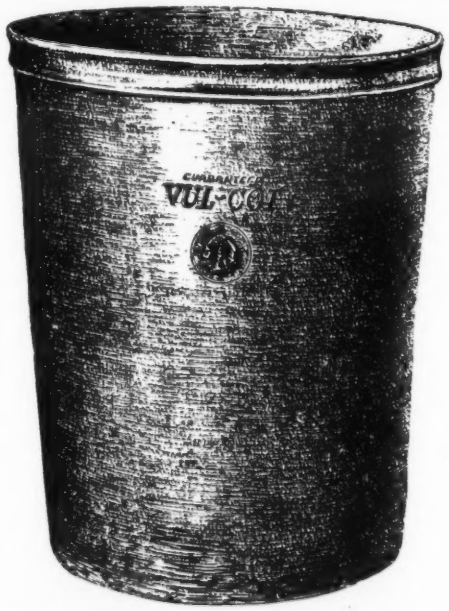

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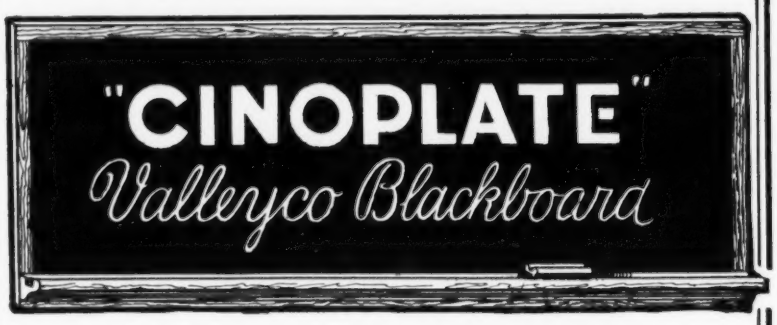

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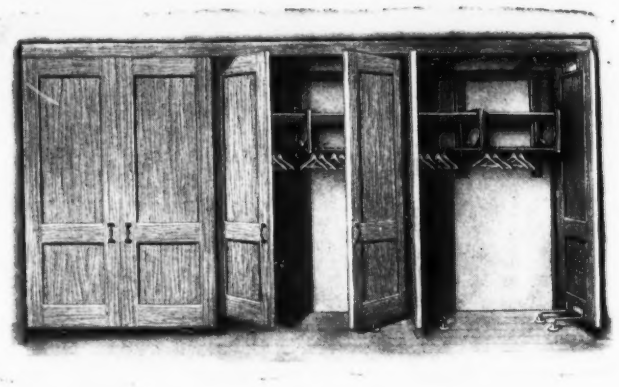

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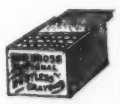

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And when he cometh unto the house, he is exceeding wroth, for the work done is little. He chideth the hireling for his slowness and fain would chastise him but he is not able.

Thereupon quothe the hireling: "I am a carpenter, and lo, I spend half my time watching the sun dial. Yea, verily, it seemeth wiser for thee to hire a mere call boy to ring the bell, and leave my time for building."

Following these words of wisdom, the publican is ashamed of his stupidity. He straightway bartereth his cloak for a Murda Program Clock, and thereafter the progress is amazing.

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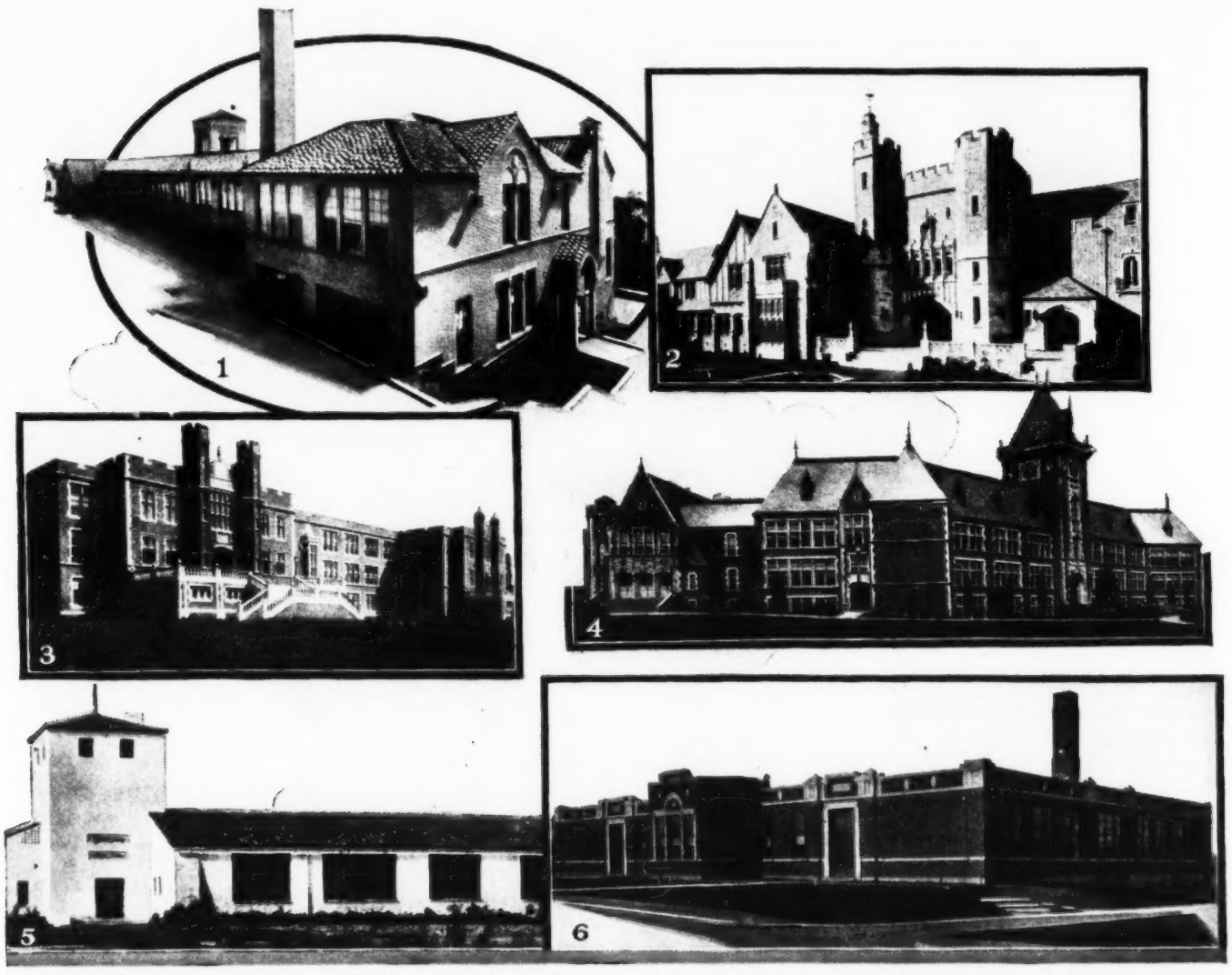

1. Linwood Elementary School, Cincinnati, Ohio. Fechheimer & Ihorst, architects.

2. East Oakland High School, Oakland, Cal. Miller & Warnecke, architects.

3. Teaneck High School, Teaneck, N. J. Hacker & Hacker, architects; Johnston Heating Co., heating contractors.

4. New Rochelle H. S. New Rochelle, N. Y. Guilbert & Betelle, architects; Johnston Heating Co., heating contractors.

5. Clarksburg High School, Clarksburg, Cal. Dean & Dean, architects; Latourrette - Fical Co., heating contractors.

6. Elementary School, Downers Grove, Ill. Joseph C. Llewellyn Co., architects.

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VOL. 82
No. 1

THE AMERICAN School Board Journal

A Periodical of School Administration

JANUARY,
1931

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The Future Schoolhouse Problem

The indications are that new schoolhouse construction, as applied to the country at large, will not be relaxed because of the temporary business depression now afflicting the country. In fact, if present indications may be relied upon, the ensuing year will see school-construction labors continued with a reasonable momentum and expedition.

The spirit of the nation is, after all, opposed to a standstill or to inactivity. The inherent resourcefulness of the country, the enterprise and energy of its people, and above all, the optimism which always comes to the fore in a trying time, will reassert themselves.

The concern for the unemployed is thoughtful and sincere. Public building projects, national, state, county, and city are urged with force and effect. The country has many needs in the way of rehabilitation of its housing, its roadmaking, and the like. The schoolhousing of the country is, by no means, wholly satisfactory or entirely adequate. New schools are needed almost everywhere. The old schools need rehabilitation. School authorities are more inclined to create work for the unemployed than to restrict their building operations.

One of the most important features of the American schoolhouse problem relates to the newer conceptions and innovations in the plan of education. The junior high school has come to stay. It means an expansion of the school plant. The vocational school, too, makes its demands.

Then there is the natural increase in the school population. It must be properly housed and trained. The school building of tomorrow must be safer, more utilitarian, and more convenient than the school building of yesterday. Enterprise, mechanical ingenuity, and constructive ability will rear better schoolhouses in the year 1931, than ever before. The order of the day is economy in construction enterprise—namely, that economy which will bring the greatest return for the dollar.

It is with that approach to the subject that the AMERICAN SCHOOL BOARD JOURNAL presents its Annual Schoolhouse Number. It embodies the best thought and achievement in the field of school architecture. Those intrusted with the housing and training of the rising generation may, with the aid of this exceptional number, solve many of their problems more readily and more efficiently.

Thus, the present number constitutes a splendid contribution to the cause of American school architecture—an architecture which has become one of the marvels of a modern day.

The Publisher

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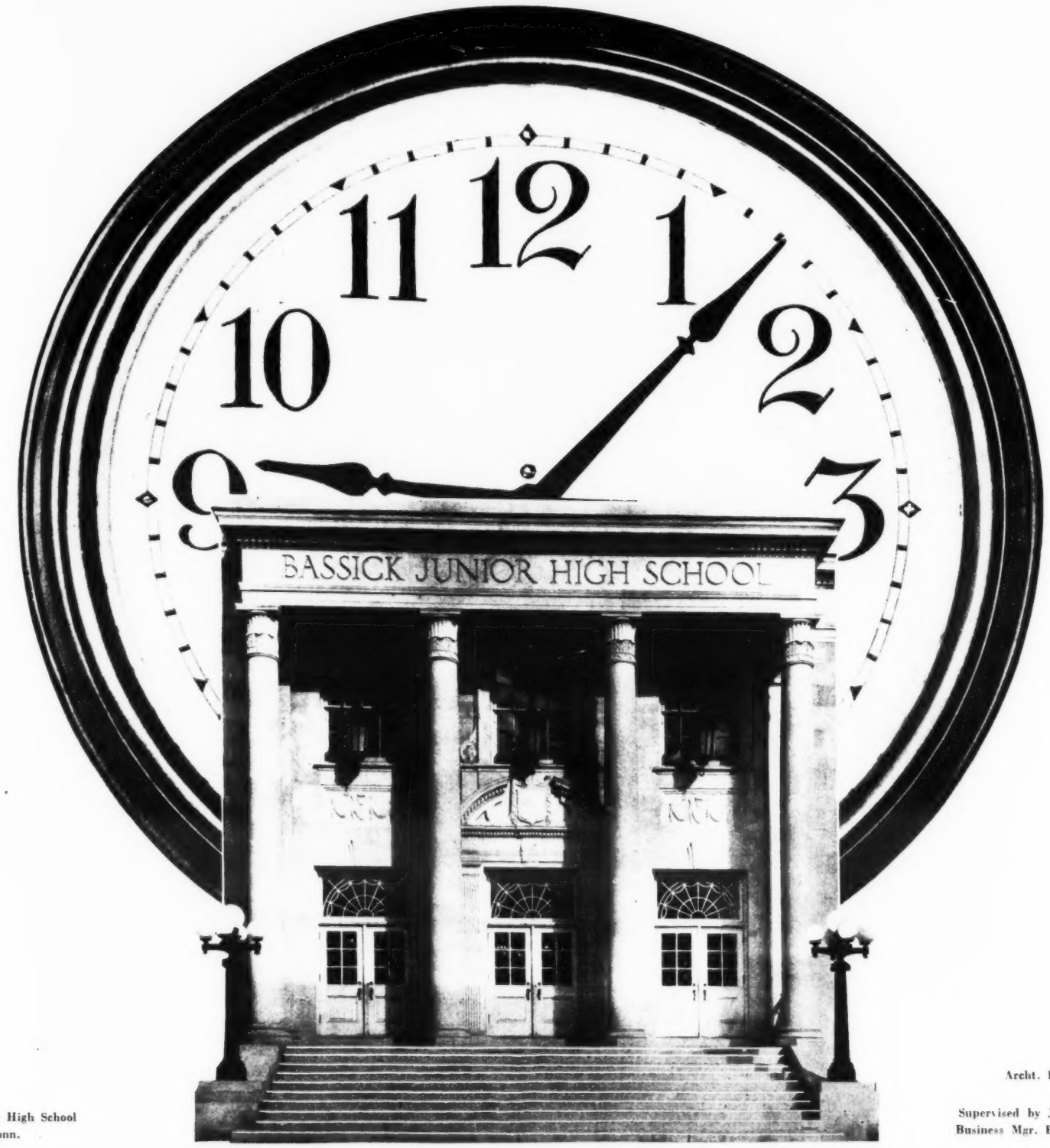
The contents of this issue are listed in the *Education Index*.

THE GATEWAY TO KNOWLEDGE



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Bridgeport, Conn.

Archt. Ernest G. Southey,
Bridgeport, Conn.
Supervised by John B. Wynkoop,
Business Mgr. Board of Education

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THE AMERICAN
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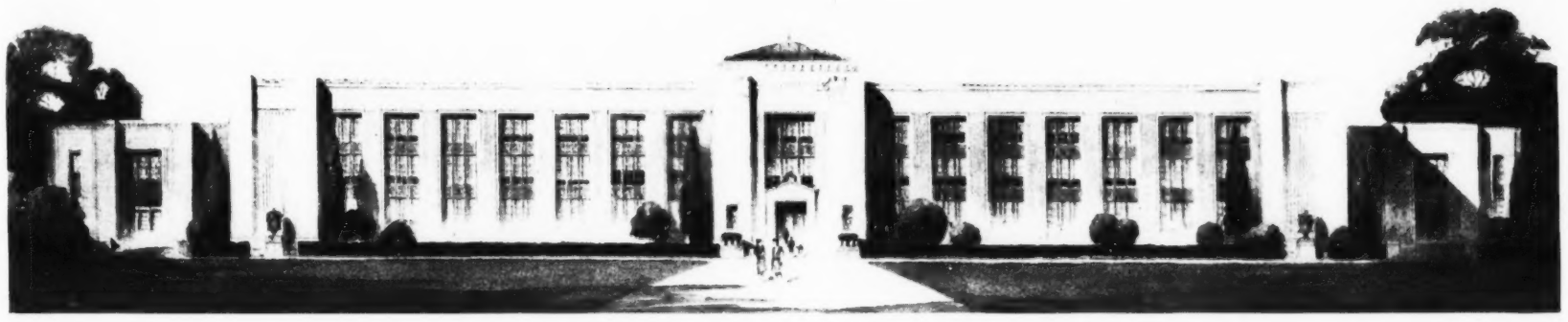


FIG. 4. MODERN DESIGN FOR THE JOHN MARSHALL HIGH SCHOOL, CLEVELAND, OHIO
George M. Hopkinson, Architect of the Board of Education
(See alternate designs on page 37)

What Quality School Building?

George M. Hopkinson, Architect, Board of Education, Cleveland, Ohio

Numerous studies have been printed on economies in school building with especial reference to plan layouts; quite a few studies have been written on the different kinds of material to use for school construction and finish. Practically nothing has been written, however — taking a building in broad perspective — on the effect which various grades of quality of construction and finish have upon final cost and ultimate economy. Apparently few studies have been made in advance of letting contracts, to weigh all the facts through the use of simple factors which will visualize the entire problem and permit the application of sound business judgment.

We seldom hear questions asked concerning the "quality" of building which the architect should design and, too frequently, this important point is never openly discussed, nor properly presented, to the laymen who control the total expenditures. We do, however, know that frequently alternate estimates are taken to settle a specific point and to find out where certain savings can be made. This method, I submit, does not give the answer that a lay mind should have to settle the all-important question of degree of quality to be adhered to in designing the building.

Of course, alternate estimates have been taken to control price combines and other evils, but this is not the point under discussion.

Economy the Important Factor

Many school authorities consider only how they may obtain the most building in volume for a given expenditure of money, not realizing for a moment the important factor of true economy, and losing sight of the well-established business axiom that initial cost is not the only consideration. Some authorities go still further and say: Here is so much money, build so many rooms, because somewhere, sometime, someone accomplished this. This procedure, of course, is very dangerous without full knowledge of the consequences and results, and a complete consideration of all the factors involved.

It may also be argued: "Why build well today? Build poorly, for tomorrow educational ideas will be so revolutionized as to make the structure obsolete and a new structure necessary." It is true that some buildings have been too well built in the past sixty years, and a survey of the Cleveland school buildings gives evidence of a certain amount of obsolescence. But, is it a more serious matter to have some buildings which are not up-to-date, or is it more serious to find the necessary funds to replace an entire school structure within twenty years after its completion? It is obvious that such replacements would mean that almost three times the amount of money would have to be provided by taxation to carry out the scheme. As an economic proposition, of course, this is out of the question. We may argue that the past centuries provide no criterion for the future, and that a revolution of an unprecedented nature is before us in education. This revolution, it may be claimed, will seriously affect schoolhouses, which, of course, may be true. But again, the revolution may not have any serious effect, and by effect I mean that it may be entirely possible to remodel the buildings built today to meet the needs fifty years from the present. We know that this has been true of buildings built in the past.

There is still another aspect of standards of quality for schoolhouses from the point of view of construction, finish, and architecture. This aspect strikes a still deeper note, and that is this: Have we in America reached a degree of public-school-building design that has stepped far beyond the stage of necessity and desirability? And should we lower the level to the extreme bottom of the simplest boxlike factory so that we may dispense education possibly on the straight-line, mass-production basis, like a tractor plant? This of course would be most revolutionary; it would be contrary to what society has already accepted as a standard for public structures provided for by the people through taxation. It would destroy an educational value of school architecture, which consists in the aesthetic influence, unconscious perhaps, exerted on children and the community at large by the permanent materials and beautiful forms of architecture.

The Basis of This Study

The foregoing thoughts cannot be disposed of in this discussion, nor can we stop building good school buildings until public sentiment and social trends vastly change our present society. We must, therefore, proceed to build according to the social and economic conditions under which we find ourselves today, always mindful of the possibilities of the future as far as we are able to look forward into the unknown.

Considering present conditions and trends, we find ourselves with schoolhouses built according to a country-wide standard, which is the same, within certain limits, in principle. It is the object of this article to analyze what we are doing within these limits from a construction and finish point of view. No attempt will be made here to deal with educational requirements, or economies in planning, as this is a separate subject. The building before us has

been amply studied from an economy point of view in connection with the educational requirements that had to be met.

The present discussion has been made possible because a new school building, the John Marshall High School, has been designed by the writer for the city of Cleveland, in three different ways, in respect to quality. The purpose of the three plans has been to determine how much more it costs initially to build well, as compared with a medium-quality building, and a poor-quality building, when providing exactly the same educational requirements for the three designs and using exactly the same floor-plan layouts.

The bids for these designs were received November 3, 1930, and consisted of separate bids for the three grades of buildings, which were designated as Grade A, Grade B, and Grade C, respectively.

The Plan Layout

While we are concerned primarily with the quality of school buildings, it will be interesting, in passing, to observe the layout of the building. The problem in planning was to devise a scheme so that this type of building could be built in units to suit the particular requirements of any district at the present time, the first unit to accommodate 1,400 pupils; the second unit, 1,850; and the final completed unit, 2,500 pupils. The building is to house both junior and senior high-school pupils as a six-year school.

The floor plans show the 1,850-student unit. The additional building necessary to complete the building for a 2,500-pupil capacity is shown in dotted lines. A unit of 1,400-student capacity would mean, in a general way, that the second and third stories would be omitted from the center rear stem of the building, leaving that portion temporarily one story high.

The plans are self-explanatory and indicate what educational facilities are provided for. One or two points in connection with the layout might be pointed out: Heretofore, Cleveland schools have provided for an auditorium to be located in the center of the building. In the present plan, this idea has been departed from, and the auditorium unit has been located at the extreme end, balanced at the other end by the gymnasium unit. This arrangement has the advantage of making possible, readily, the segregation of the two units from the balance of the building, when the auditorium and gymnasium are used for night activities and community purposes.

The lunchroom is located over the large gymnasium, which makes this unit the full height of the auditorium unit, and results in architectural balance. It will be noted that one large gymnasium is provided, fully equipped with bleachers for exhibition games, also a smaller gymnasium for girls, of ample size for instruction purposes. A corrective gymnasium is made possible by omitting the permanent bleachers from one end of the large gymnasium, and utilizing the floor space for this purpose. Provision has been made for demountable wood bleachers over this area when required.

The writer is well aware that alternative arrangements could have been made in the plan layout at the sacrifice of educational facilities. It would have been possible to use a combination stage and gymnasium with folding doors, instead of two separate spaces for these purposes. The balcony might have been omitted from the auditorium, and the lunchroom might have been placed in the basement. Other makeshift arrangements could have been practiced to the detriment of educational administration.

Architectural Treatment

Three degrees or classes of elaborateness for the exterior architecture of the building were studied, and these are shown in the accompanying cuts: Figure 1 is an elaborate Georgian design; Figures 2, 3, and 4 are medium-cost de-

CONSTRUCTION DETAILS FOR THREE GRADES OF SCHOOL-BUILDING CONSTRUCTION

Item	*Grade A*	*Grade B*	*Grade C*
1. Structural Design	Long-span reinforced-concrete floor slabs Roof — Precast slabs on steel purlins Steel columns and floor girders	Long-span reinforced-concrete floor slabs Roof — Precast slabs on steel purlins Steel columns and floor girders. Certain floor girders reinforced concrete	Open-joist floor construction. Steel columns and girders Roof — Light deck on steel purlins Steel lightened on account of less dead load
2. Floor	Maple floors in classrooms, tile floors in corridors, toilets, and locker rooms	Linoleum covering on cement in classrooms, composition floors in corridors, terrazzo in toilets and locker rooms	Composition tile in classrooms, composition in toilets and locker rooms, cement in corridors
3. Exterior Wall Construction	Face-brick with solid brick backing, air space, and tile furring	Face-brick with solid brick backing, air space, and tile furring	Face-brick with hollow tile backing (no furring) and dampproofing
4. Brick Mortar	Portland cement	Natural cement	Natural cement
5. Exterior Architectural Trim	Stone	Terra cotta	Artificial stone
6. Interior Partitions	Hollow clay tile or precast partition blocks	Gypsum partitions optional in addition	Metal lath and plaster partitions optional in addition
7. Roof Covering	5-ply tar and gravel (double gravel) laid according to Board's standards	Contractor's specification roof with 10-year guarantee	Contractor's specification roof with 5-year guarantee
8. Roof Flashings	Copper	Copper bearing, metal galvanized	Galvanized iron
9. Skylights and Vents	Copper	Copper bearing, metal galvanized	Galvanized iron
10. Exterior Doors	Hollow metal	Wood	Wood
11. Windows	Wood	Wood	Factory steel sash
12. Stairs	Steel, covered with tile treads and risers, alundum nosings	Terrazzo treads steel risers	Mastic-filled treads, steel risers
13. Toilet-Stall Partitions and Wainscot	Marble partitions and wainscot	Metal partitions tile wainscot	Metal partitions plaster wainscot
14. Interior Doors and Trim	Oak, stained, three coats varnish	Oak, stained, one coat varnish	Pine, two coats paint
15. Blackboards	Slate	Slate	Composition
16. Bulletin Boards and Tacking Spaces	Cork	Cork	A substitute material for bulletin boards. Tacking spaces entirely omitted
17. Gymnasium Interior Wall Surfaces	Face-brick	Face-brick	Common brick painted
18. Gymnasium Ceilings	Acoustical treatment	Concrete construction exposed with cement wash	Plaster on underside of open-joist construction
19. Lunchroom Floor and Ceiling	Floor — maple, Ceiling acoustical treatment	Floor — linoleum, Ceiling acoustical treatment	Floor — composition tile, Ceiling plastered
20. Assembly Room	Floor-cement Plaster architectural treatment for walls and ceiling	Floor — cement Modified plaster architectural treatment for walls and ceiling	Floor — cement Plain plaster walls and ceiling
21. Acoustical Treatment	Provided for: Gymnasiums Lunchroom Band Room Assembly Room Music Room Radio Room The amount of acoustical treatment in the assembly room sufficient to provide proper conditions for future talking movies	Provided for: Same as "A" except omitted from gymnasiums The amount of acoustical treatment in the assembly room sufficient for only ordinary purposes	Provided in: Assembly Room *only* and just sufficient for ordinary purposes
22. Teachers' Wardrobes	Double built-in wood wardrobes in each room	Portable single metal cabinets	Portable single metal cabinets
23. Window Spandrels	Aluminum	Aluminum	Artificial stone
24. Exterior Steps and Platforms	Granite	Stone	Cement
25. Window Stools	Marble	Wood	Cement
26. Garbage Incinerator	Brick chamber in basement fed by vertical drop flue	Omitted	Omitted
27. Elevator	Electric freight	Electric freight	Electric freight
28. Bases for Lockers in Corridors and Locker Rooms	Six-in. high cement-faced with cove tile	Omitted (lockers to set on legs)	Omitted (lockers to set on legs)
29. Coal Vaults and Stack	Provided complete (for coal-burning plant)	Provided complete (for coal-burning plant)	Coal vaults omitted Stack reduced 25 ft. in height (for oil-burning plant)
30 Boilers and Stokers	Three brick-set H.R.T. boilers with underfeed stokers	Three brick-set H.R.T. boilers with underfeed stokers	Three fire-box type boilers with oil burners
31. Heating and Ventilating	See explanation under heading of "Mechanical Work"		
32. Vacuum-Cleaner System	Complete stationary system with outlet in every room	Complete stationary system with outlet in every room	Complete stationary system with outlet in every room

CONSTRUCTION DETAILS FOR THREE GRADES OF SCHOOL-BUILDING CONSTRUCTION
(Concluded)

Item	*Grade A*	*Grade B*	*Grade C*
33. Electric Time Clocks	Master Clock in Clerk's Office and secondary clocks in every room. Program device	Master Clock in Clerk's office and secondary clocks in each corridor, Lunchroom, Gyms, and Assembly room only Program device	Master Clock in Clerk's office. All other clocks portable hand-wound. Program device
34. Fire Alarm	Complete manual with auxiliary electric gongs	Complete manual with auxiliary electric gongs	Complete manual with auxiliary electric gongs
35. Telephones	Full automatic dial-system phone in each room	Full automatic dial-system phone in each room	Telephones omitted
36. Electric-Light Switches	Double pole	Double pole	Single pole with smaller-sized conduits
37. Main Switchboard	Triple contacts and fuses	Triple contacts and fuses	Double contacts and fuses with solid bar contacts. Power panel cut on account of oil burners, etc.
38. Electric Base Plugs	At rear of each room in addition to general requirements	At rear of each room in addition to general requirements	Omitted from rear of each room
39. Radio Conduit	Installed for a loud speaker in each room	Installed for a loud speaker in each room	Installed for a loud speaker in each room
40. Electric Wiring	Complete in all requirements. Six 200-watt outlets in each typical room	Complete same as "A"	Complete same as "A" except for certain changes noted above
41. Electric Fixtures	Not included	Not included	Not included
42. Plumbing	Complete to meet modern sanitary requirements	Complete to meet modern sanitary requirements	Complete to meet modern sanitary requirements
43. Furniture	Not included	Not included	Not included
44. Landscaping	Not included	Not included	Not included

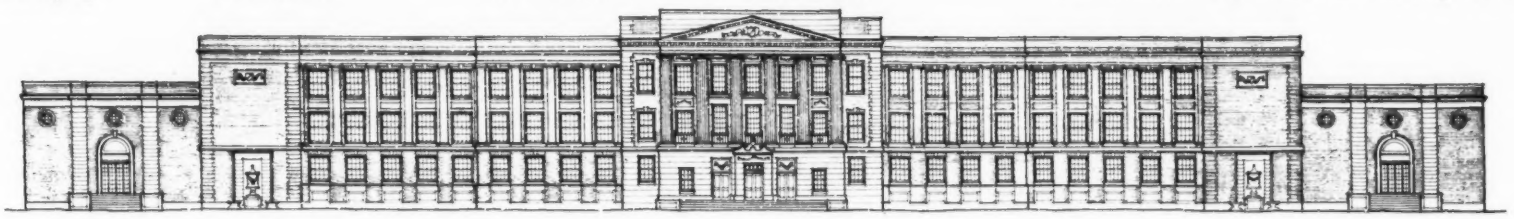
signs in classical, Colonial, and modern styles, respectively; Figure 5 is a plain factory-type building.

It was estimated there is a $50,000 difference in cost between each of the three degrees of elaborateness noted above, that is, between the elaborate design shown in Figure 1 and any of the three medium-cost designs shown in Figures 2, 3, and 4. The same difference in cost would result between any of the three medium-cost designs and the plain factory type shown in Figure 5. In other words, there was a differential of $50,000 between elaborate detail, medium detail, and plain factory treatment. Of course, the degree of ornament or treatment could have been varied in such a way as to make the difference in cost still more or somewhat less, but the object was to strike a medium level in each particular class.

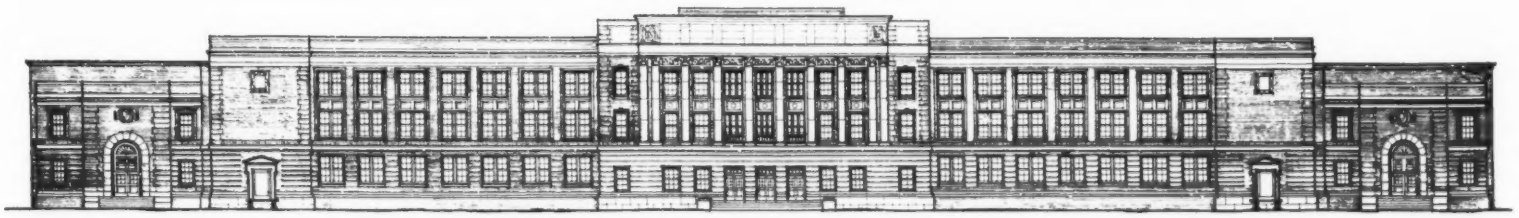
The question of degree of architectural treatment was settled in advance to simplify the taking of bids in connection with construction, materials, and finish for the entire building. Otherwise complications would have resulted. The modern type of design in Figure 4 was selected as the architectural design to be applied to the Grades A, B, and C.

Grading as to Quality

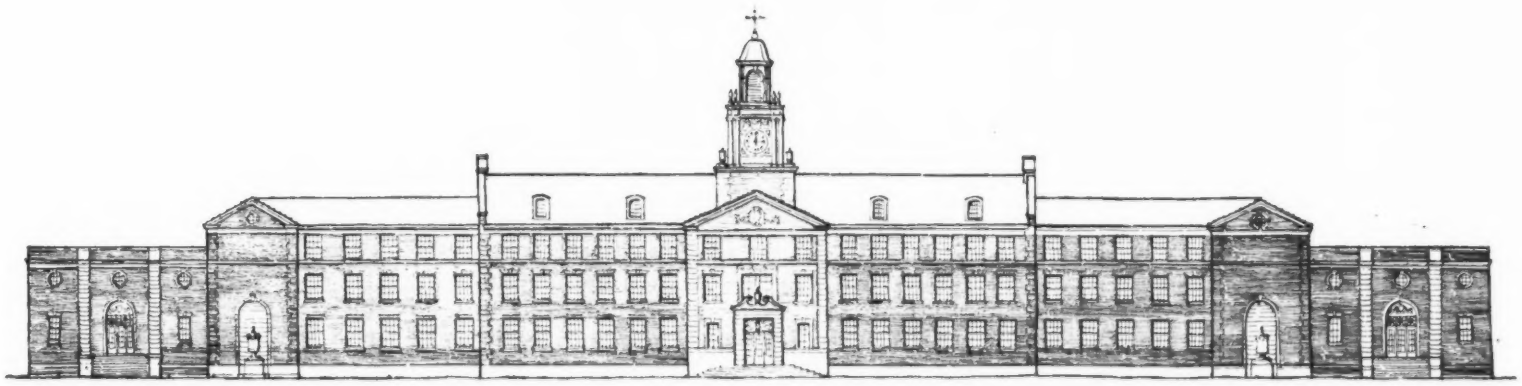
As previously stated, the object in grading was twofold: (1) to find out exactly how much



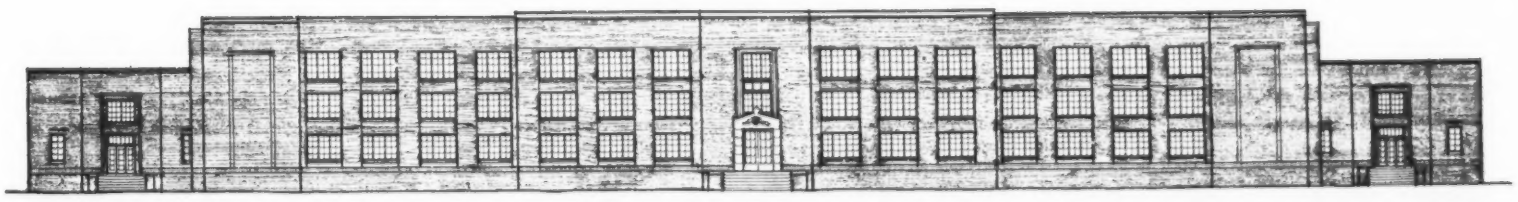
GEORGIAN-TYPE
FIG. 1



CLASSIC-TYPE
FIG. 2



COLONIAL-TYPE
FIG. 3



INDUSTRIAL-TYPE
FIG. 5

FOUR OF THE FIVE TYPES OF DESIGN DISCUSSED BY MR. HOPKINSON FOR THE JOHN MARSHALL HIGH SCHOOL, CLEVELAND, OHIO
THE ACCEPTED DESIGN IS SHOWN ON PAGE 35

difference in cost there is between different qualities of buildings, and (2) to set the problem up in such fashion that it could be intelligently judged by the lay mind, for the adoption of a building policy. Grading in such manner for these purposes is far superior to the ordinary method of taking haphazardly a number of alternate estimates.

The writer realizes that the degrees of grading, as determined above, are subject to question and discussion, because, after all, they are based on judgment and experience. In this particular case, they represent the writer's personal experience and judgment as to what constitutes good, medium, and poor quality of school buildings.

It is admitted that, in many cases, a certain material could have been used in more than one grade of construction, and this, as a matter of fact, has been done. The analysis will show that some materials have a certain value for which there is no reasonable or suitable substitute.

The following table will give at a glance some of the main subdivisions determined upon for the three grades of building.

Mechanical Work

Under the head of mechanical work, the heating and ventilating is of special interest and, while we did not have the time to carry differences in the mechanical trades to the furthest possibility, still the extent to which the study was extended, in a general way, was a great step forward and at some future time it may be possible to go still farther.

For the purpose of the present study, heating and ventilating was graded as follows:

Grade "A" — Central fan system with positive mechanical exhaust. H. R. T. boilers with underfeed stokers.

Grade "B" — Unit system of heating and ventilating with gravity exhaust. H. R. T. boilers with underfeed stokers.

Grade "C" — "Modified" unit system of heating and ventilating with gravity exhaust. H. R. T. boilers using oil burners.

The order of grading does not necessarily mean that a stand was taken in favor of one or the other system or that the particular systems were considered fixed in the order of grading stated. In fact, we were willing to leave to further discussion and debate, upon receipt of bids, the relative merit of the various systems.

Realizing that the matter of heating and ventilating is possibly the most controversial detail of the construction of a school building, a cross system of alternate estimates was arranged whereby it was possible to substitute, in any grade building, a type A, B, or C heating and ventilating plant, depending upon the difference in price which would warrant such action.

It is interesting to note the results of the bidding on the different systems. After taking into consideration the total additions and deductions in connection with the general construction items that were affected through changes from one particular mechanical system to another, there were some surprising changes in the results.

Grade A Building

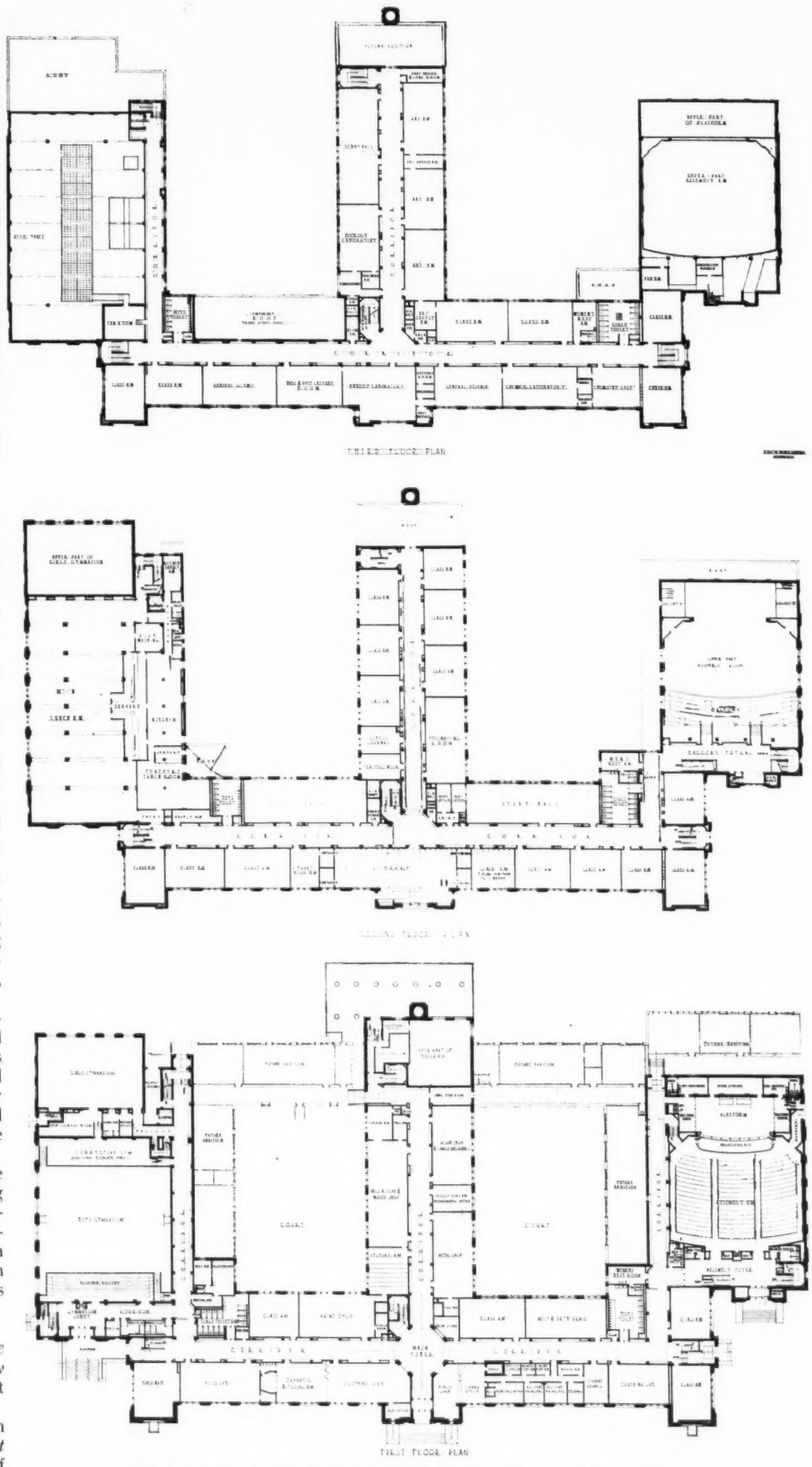
1. Taking a *central fan* system with *positive exhaust* as a basis, the *unit system* with *gravity exhaust* showed a *saving* of 4 3/10 per cent under the central fan system.

2. Again, taking a *central fan* system with *positive exhaust* as a basis, the *"modified" unit system* with *gravity exhaust* showed a *saving* of 7 6/10 per cent under the central fan system.

Grade B Building

1. Taking a *central fan* system this time with *gravity exhaust* as a basis, the *unit system* with *gravity exhaust* showed an *additional cost* of 4 5/10 per cent over the central fan system.

2. Again, taking a *central fan* system with *gravity exhaust* as a basis, the *"modified" unit system* with *gravity exhaust* showed an *additional cost* of 2 per cent over the central system.



FLOOR PLANS OF THE JOHN MARSHALL HIGH SCHOOL, CLEVELAND, OHIO
George M. Hopkinson, Architect of the Board of Education

Note: The above figures are expressed with the central fan system figures as a *basis* in each case so as to make the statements easier to visualize.

Grade C Building

The basis of figures for a Grade C building, being based on an oil-burning plant which meant the omission of coal bunkers and part of the stack, etc., showed quite a reduction in initial outlay. The operation of such a plant, from an operating-expense point of view, was in the writer's opinion out of the question and, therefore, will not be presented here.

The above figures proved interesting in view of the fact that on two previous occasions a test

(Continued on Page 132)

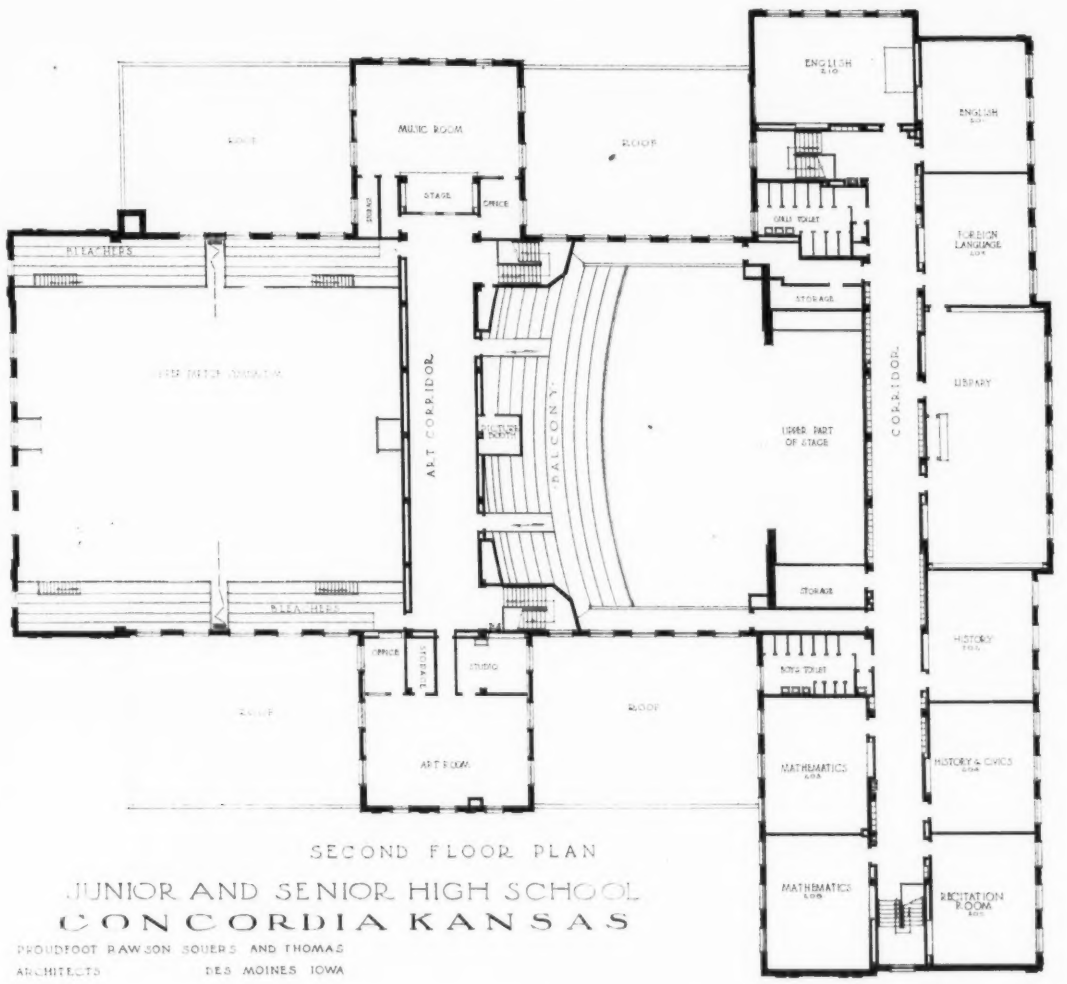
The Concordia, Kansas, Junior-Senior High School

Edgar B. Allbaugh, Superintendent of Schools, Concordia, Kansas.
and Oren Thomas, Architect, Des Moines, Iowa

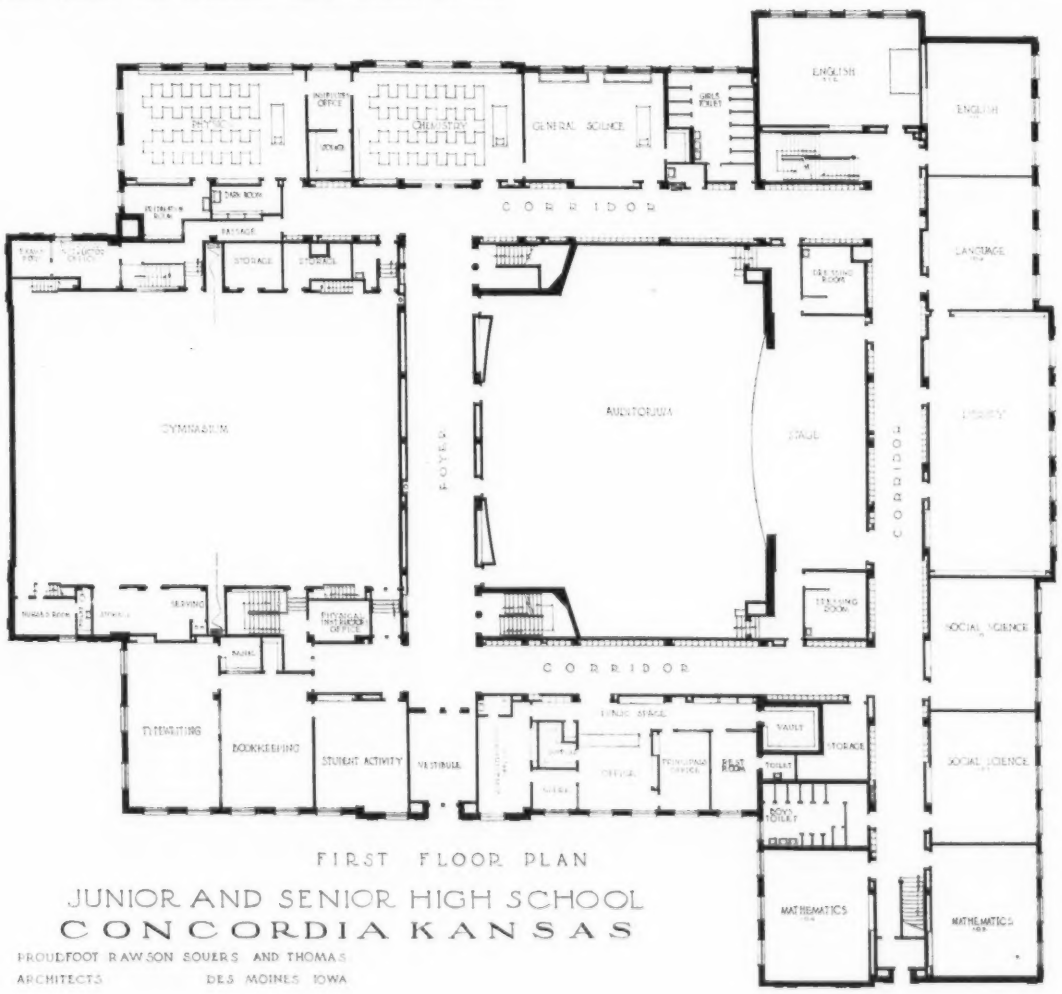
Concordia, Cloud county, Kansas, a beautiful city of six thousand population, located in the Republican River Valley in the north-central part of the state, is justly proud of its new high-school building, completed in the fall of 1930, at a cost of approximately $340,000, including equipment and architect's fees for plans and supervision of construction.

The Georgian Colonial type of architecture has been used. The building is distinct in external appearance. The box type of building is not at all apparent. As you approach it from any angle, the perspective is different. The building is located on the northwest corner of a city block which was very irregular in contour and has a slope of about 35 feet from the northwest corner to the southeast corner. This condition, of course, was quite a factor in determining the general type of the building. The space covered is approximately 200 feet in length and the same in width, making due allowances for the offsets. The building is three stories high on the southeast and two stories high on the northwest. There is no part of the building, except the administration unit, that does not receive, at some time during the day, some direct sunlight. The room in which the heating plant and the general mechanical controls are located is the only one below grade level.

There are eight outside entrances to the building, two on the north, four on the east, and two on the south. The two on the north are the main entrances into the academic unit and the spacious corridors; the doors on the east enter the cafeteria, the physical-education units and the swimming pool, and the heating unit. In addition to these four entrances on the east there are four exterior French-door windows into the pool. The entrances on the south enter the vocational-agriculture and mechanical-arts units and into a general corridor, from which the students have access to the



SECOND FLOOR PLAN
JUNIOR AND SENIOR HIGH SCHOOL
CONCORDIA KANSAS
PROUDFOOT RAWSON SOUERS AND THOMAS
ARCHITECTS DES MOINES IOWA



FIRST FLOOR PLAN
JUNIOR AND SENIOR HIGH SCHOOL
CONCORDIA KANSAS
PROUDFOOT RAWSON SOUERS AND THOMAS
ARCHITECTS DES MOINES IOWA

home-economics unit and the building in general.

Above the two north entrances are engraved these two mottoes, "Concordia High School" and "To Perpetuate Learning for Our Children"; over the main south entrance the visitor finds the motto, "The Days that Make Us Happy Make Us Wise." This main south entrance will lead to athletic field. This project is not now completed.

As indicated in the foregoing the building is constructed on the unit basis.

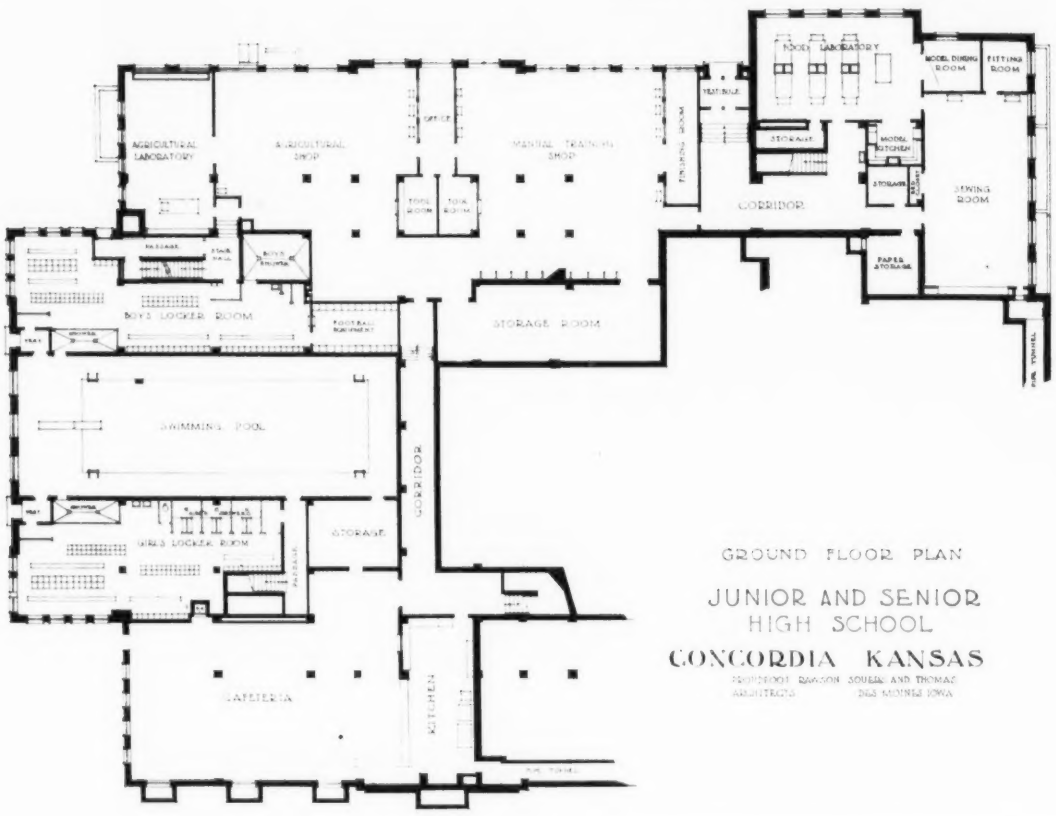
Ground Floor

On the ground floor there is a cafeteria with a student capacity of approximately two hundred at one sitting. This room is readily accessible from both the outside and the main corridor as well as from the manual-arts room. It is located in the northeast corner.

South of the cafeteria one finds the swimming pool, 60 feet long, 20 feet wide, with a sloping depth varying from 3 feet, 10 inches, at one end to 8 feet, 6 inches, at the other. On either side of the pool are located the lockers and dressing rooms. These rooms are equipped with box lockers, storage space for athletic equipment, and showers. Of course, this part of the building is readily accessible to the gymnasium just above, and each stairway leading from the gymnasium is supervised by the directors of physical education, their offices being well located for this purpose.

South of the boys' locker room are located the rooms for vocational agriculture and mechanical arts, which include woodwork, mechanical drawing, sheet-metal work. These rooms are equipped with standard machinery. The department contains also a finishing room.

The vocational-agriculture shop is divided into two distinct parts: the one for recitation and experimentation and the other for labora-



GROUND FLOOR PLAN

JUNIOR AND SENIOR HIGH SCHOOL

CONCORDIA KANSAS

PROUDFOOT RAWSON SOUERS AND THOMAS ARCHITECTS DES MOINES IOWA

Cost Data

General Construction (Including built-in cases and lockers)	$248,061.03
Plumbing, Heating, and Ventilating	45,333.27
Electrical Work	8,831.32
Equipment	22,866.26
Architects' Fees	16,254.60
Total Cost	$341,346.48
Cost per pupil capacity	$ 342.00
Cost per pupil present enrollment	550.00
Cost per cubic foot (complete)	25.7 cents
Cost per cubic foot (without equipment or architests' fees)	22.7 cents
Contents of building	1,326,000 cu. ft.

tables are provided with 2-student down-draft fume hoods. Here also is found a teacher's demonstration desk. Between the chemistry room and the physics room is located the instructor's office. The physics laboratory contains two 12-student tables. The instructor's table is similar to the one found in the chemistry laboratory. In all three rooms are found suitable lockers, shelving cases, storerooms. The science units are supplied with gas, water, and electrical connections.

The gymnasium is located in the east end of the building on the first floor, with a playing floor 60 by 80 feet. It may be divided into two parts by a folding-door partition. The gymna-

(Continued on Page 134)

tory work on pieces of farm machinery, automobiles, etc. These two units are divided by an apartment in which are located teachers' offices and two toolrooms.

On this same floor to the west is the department of home economics. In the domestic-science room are located the unit kitchen and dining room and food laboratory. The sewing room, fitting room, and lockers are all a part of this unit.

First Floor

On the first floor are located the administration unit, 7 academic classrooms, a library, 2 toilets, storerooms, 3 rooms for the science unit, 3 rooms for the commercial unit, the auditorium, and the gymnasium.

In the administrative unit are found an office for the board of education and the superintendent, a separate office for the clerk of the school board, an office for general administration, a principal's office, a women teachers' restroom, a vault, a post office, and a telephone booth. In this unit are located the controls for the timing system, the private telephone system, and the radio control. The floor is covered with battleship linoleum.

The 7 academic classrooms are located on the west side. A typical classroom contains 30 tablet-arm chair desks, slate blackboard, bulletin boards, secondary clocks, a buzzer, telephone connection with the administrative unit, thermostat, a radio outlet, teacher's desk and chair, metal lockers for teacher, map case, and a bookcase. Above each front blackboard are found adjustable map rails. The ceiling is of sound-absorbing material.

The library is equipped with library tables large enough to seat 6 pupils each, metal shelving, and battleship-linoleum floor. The seating capacity is approximately 96. This room is centrally located on the west side. The 2 social-science rooms on this floor as well as on the second floor are equipped with magazine racks, etc. The English room on the south is supplied with an elevated platform. The room immediately above on the second floor is equipped likewise.

The science unit, which has south exposure, is furnished with efficient equipment. In the biology and general-science room are found an aquarium, germination beds, tables 60 inches long by 24 inches wide by 30 inches high, chairs, suitable lockers, stone sink, and a teacher's demonstration desk. The chemistry laboratory is equipped with two 12-student chemistry tables with suitable drawers and cases. These

SHOWING BUILDING UTILIZATION — SCHEDULE OF CLASSES - SCHOOL YEAR 1930-31 — CONCORDIA, KANSAS, SCHOOL

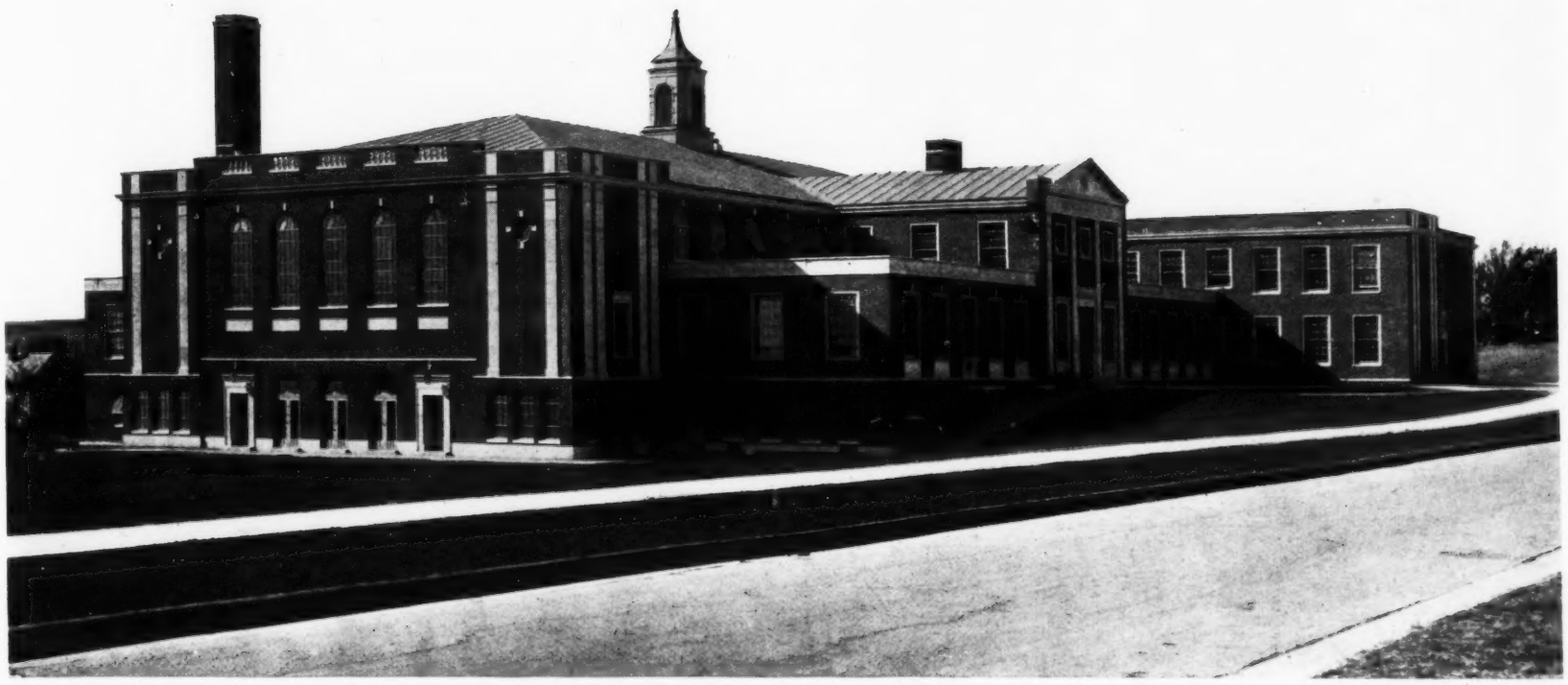
ROOM DESIGNATION	FIRST PERIOD	STUDENTS	SECOND PERIOD	STUDENTS	THIRD PERIOD	STUDENTS	FOURTH PERIOD	STUDENTS	FIFTH PERIOD	STUDENTS	SIXTH PERIOD	STUDENTS	Average Class Size	Student Capacity	Vacant Periods
104	Algebra	24	Algebra	26	Algebra	26	Algebra	28	Vacant		Algebra	33	27	35	1
105	Advanced Mathematics	12	Geometry	18	Correct Math	28	Geometry	26	Geometry	28	Geometry	13	21	35	0
106	Latin I	23	Latin II	9	Latin II	14	Latin I	24	Cicero IV	9	English	23	17	35	0
107	Social Civics	22	Vacant		World History	30	World History	15	Social Civics	28	Social Civics	25	22	35	1
110	American History	27	Vacant		American History	26	American History	22	American History	26	History 7	19	24	35	1
111	English II	24	English III	22	English III	27	Vacant		English III	34	English 8	25	27	35	1
112	English IV	29	English IV	25	English IV	30	Creative English	20	Vacant		Vacant		26	35	2
201	English 7	27	English 8	26	English 8	29	English 8	27	English 7	28	English 7	20	26	40	0
202	History 8	33	History 8	38	Geography 7	20	History 8	33	Geography 7	28	Geography 7	29	30	40	0
203	Arithmetic 7	32	Arithmetic 7	30	Arithmetic 7	20	Arithmetic 8	25	Arithmetic 8	18	Arithmetic 8	20	25	40	0
204	Civics 8	39	Civics 8	26	Civics 8	39	Vacant		Vacant		Vacant		35	40	3
205	Vacant		Physiology	12	Health	32	Vacant		Vacant		Vacant		22	40	4
208	Vacant		History 7	27	Vacant		Psychology	16	Geography	14	Arithmetic	14	18	40	2
209	Spanish II	10	Elementary Spanish	6	French I	23	Spanish I	17	French II	18	Vacant		15	40	1
210	English 7	23	English V	31	Debate Dramatic	16	Correct English	22	English V	32	English V	24	25	35	0
Junior H. Library	Penmanship Spelling	64 90	Penmanship Spelling	57	Penmanship Spelling	39	Study	62	Study	40	Study	90	63	100	0
Senior H. Library	Study	80	Study	75	Study	84	Study	70	Study	72	Study	80	76	100	0
Physics Lab.	Vacant		Physics	14	Vacant		Physics	13	Biology	29	Biology	30	22	30	2
Chemistry Lab.	Vacant		Vacant		Chemistry	25	Vacant		Vacant		Vacant		25	30	5
General Science	Biology	28	Vacant		Vacant		Vacant		General Science	37	General Science	29	32	40	3
Agriculture Lab.	Nor.Trg. Agriculture	32	Vocational Agriculture	23	Vocational Agriculture	23	Vocational Agriculture	19	Vocational Agriculture	19	Vocational Agriculture	19	23	35	0
Typewriting	Vacant		Typing II	11	Typing I	17	Typing I	22	Vacant		Typing	22	20	35	2
Bookkeeping	Shorthand	19	Spelling Penmanship	26	Shorthand I	27	Commercial Arithmetic	30	Bookkeeping	21	Bookkeeping	20	24	35	0
Commercial Lab.	Vacant		Vacant		Vacant		Vacant		Vacant		Vacant			30	6
Food Lab.	Vacant		Foods I	14	Foods II	11	Foods II	24	Foods I	25	Vacant		19	30	2
Sewing Room	Household Management	10	Vacant		Vacant		Sewing 7	20	Sewing 8	24	Sewing II	12	17	30	2
Manual Trg. Room	Shop I	19	Shop II	23	Shop I	35	Shop 7	25	Shop 8	23	Vacant		23	30	1
Music Room	Glee Club	14	Orchestra Band	46 41	Vacant		Music 7	26	Music 8	28	Junior H. Band	27	30	50	1
Art Room	Vacant	23	Vacant		High School Art	12	Art 7	15	Art 8	24	Mech.Drg.	19	30	50	1
Boys' Gym	T.T. 9-10-11-12	28	T.T. 9-10-11-12	24	T.T. 9-10-11-12	21	M.W.7th.T.T. 9-10-11-12	49 25	M.W.8th.T.T. 9-10-11-12	49 29	T.T. 9-10-11-12	33	33	50	0
Girls' Gym	T.T. 9-10-11-12	27	T.T. 9-10-11-12	31	T.T. 9-10-11-12	31	M.W.7th.T.T. 9-10-11-12	30 27	M.W.8th.T.T. 9-10-11-12	40 18	M.W.8th T.T 9-10-11-12	16 33	28	50	0

ANALYSIS

Average Size of Class (Academic Subjects)	25
Vacant Class Periods with Present Schedule (Academic Rooms)	16
Available Class Periods (Academic Rooms)	90
Vacant Class Periods with Present Schedule (Rooms)	20
Available Class Periods (Special Rooms)	84
Per Cent Efficiency Use of Academic Rooms (Class Size Disregarded)	82.3%
Per Cent Efficiency Use of Special Rooms (Class Size Disregarded)	76.2%
Per Cent Efficiency Use of all Rooms (Class Size Disregarded)	80.0%

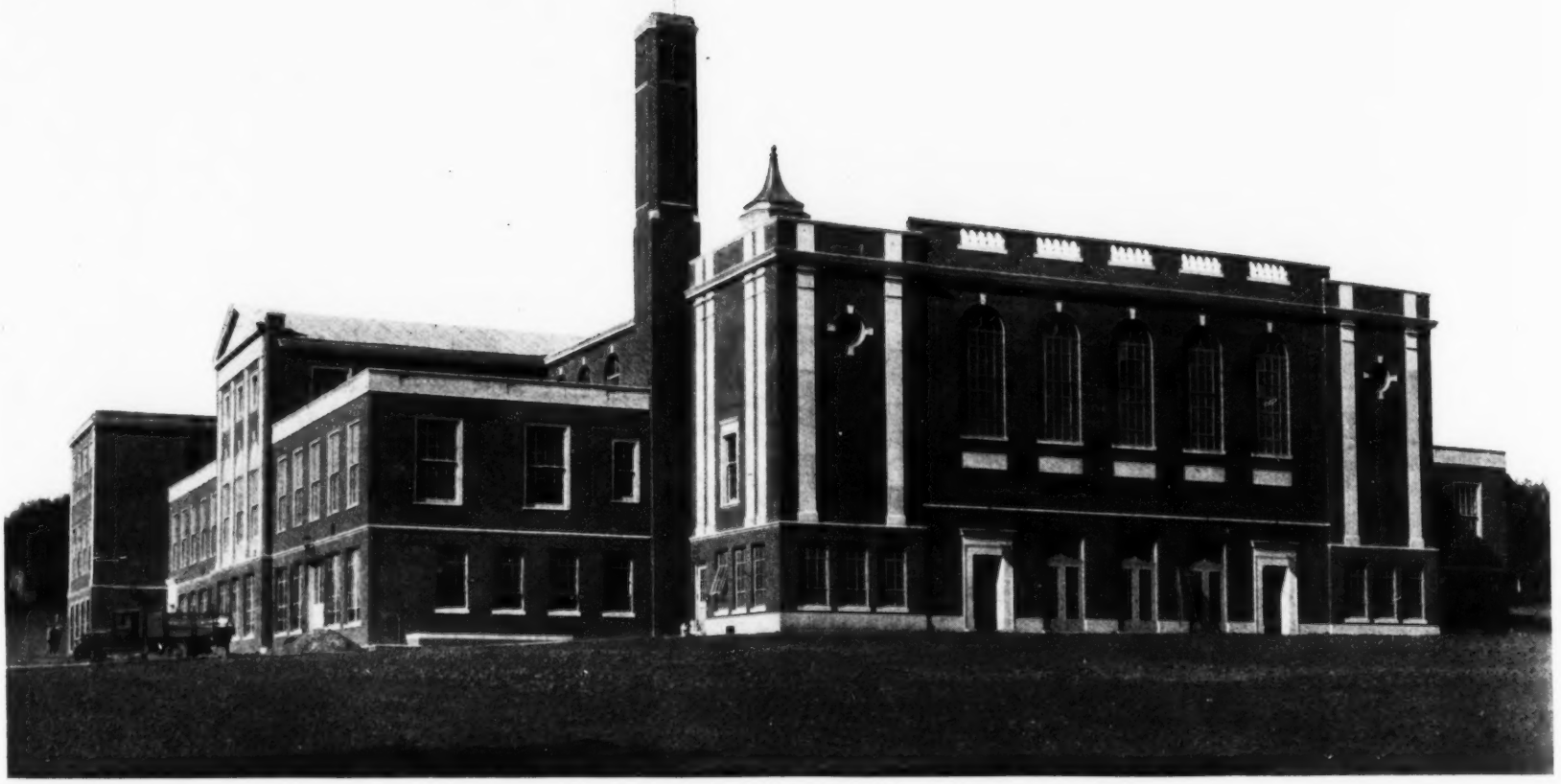
Prepared by

PROUDFOOT, RAWSON, SOUERS AND THOMAS, ARCHITECTS



JUNIOR-SENIOR HIGH SCHOOL, CONCORDIA, KANSAS
Proudfoot, Rawson, Souers and Thomas, Architects, Des Moines, Iowa

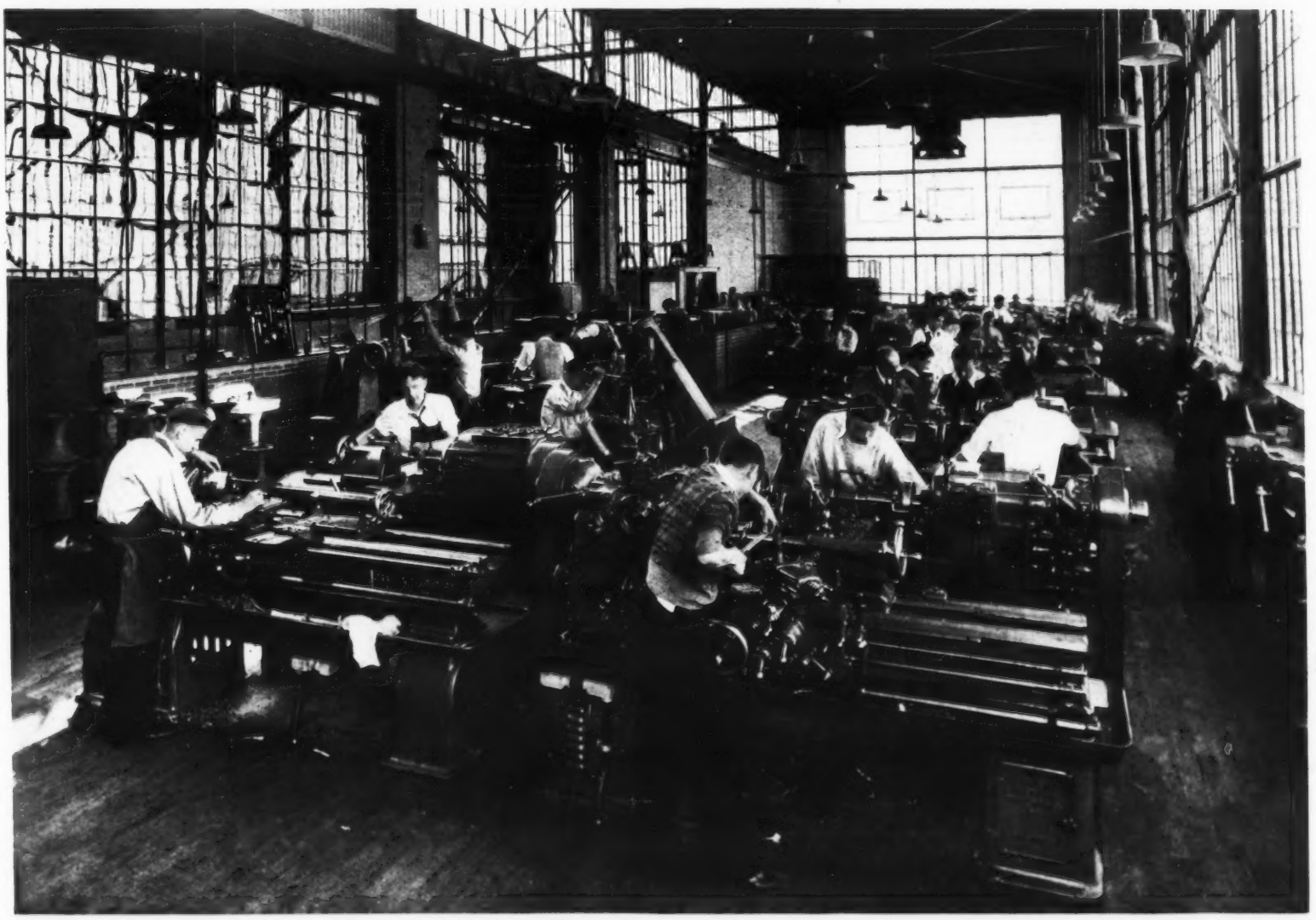
INTERIOR VIEWS OF THE JUNIOR-SENIOR HIGH SCHOOL, CONCORDIA, KANSAS
Proudfoot, Rawson, Souers and Thomas, Architects, Des Moines, Iowa
TOP, Sewing Room and Bookkeeping Room; BOTTOM, Geography and History Room, and General Science Laboratory.



REAR VIEW, JUNIOR-SENIOR HIGH SCHOOL, CONCORDIA, KANSAS
Proudfoot, Rawson, Souers and Thomas, Architects, Des Moines, Iowa

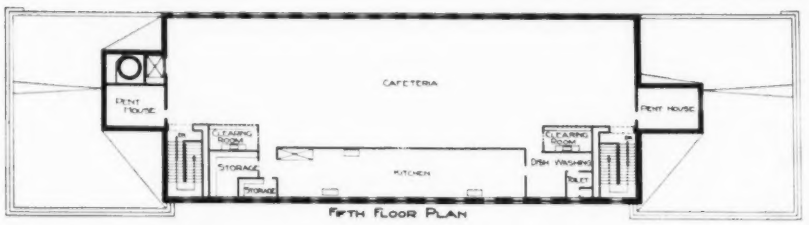
INTERIOR VIEWS OF THE JUNIOR-SENIOR HIGH SCHOOL, CONCORDIA, KANSAS
Proudfoot, Rawson, Souers and Thomas, Architects, Des Moines, Iowa
TOP, Art Corridor and Library; BOTTOM, Music Room and Agriculture Shop.

CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania

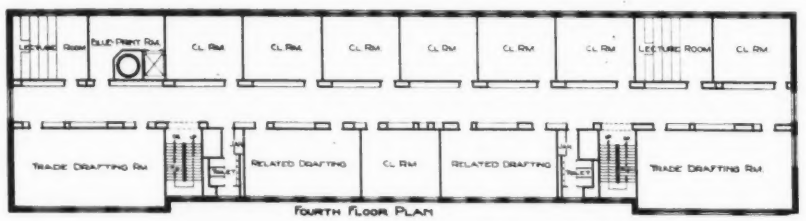


MACHINE SHOP, CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania
The height of this shop has been provided to care for a planned expansion.

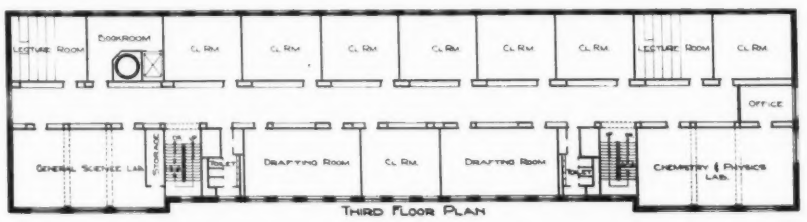
CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania
The building in the right foreground is an old school which is to be removed.



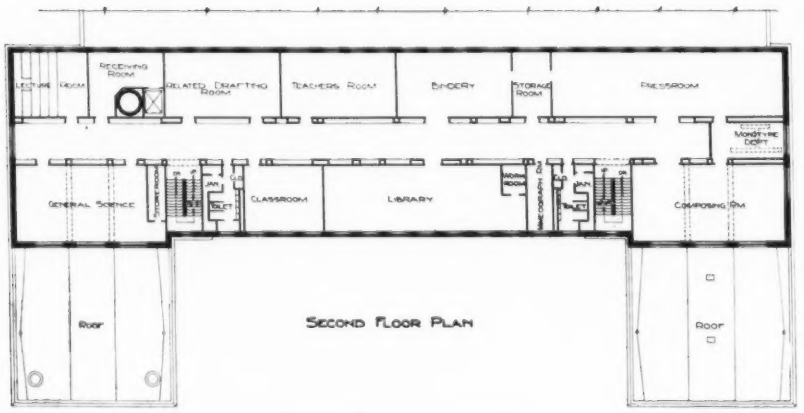
FIFTH FLOOR PLAN



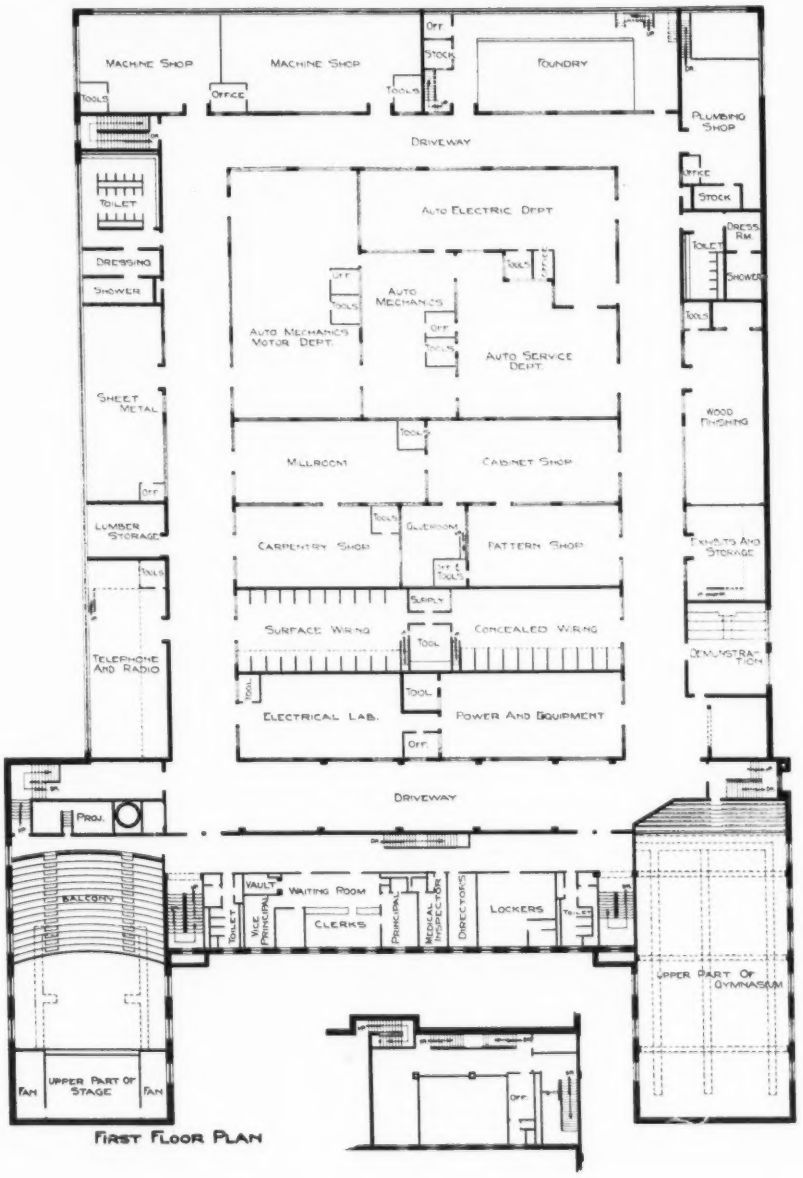
FOURTH FLOOR PLAN



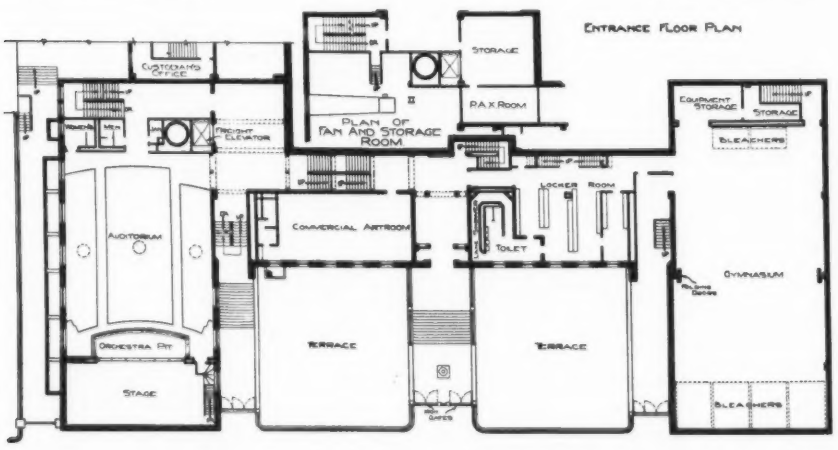
THIRD FLOOR PLAN



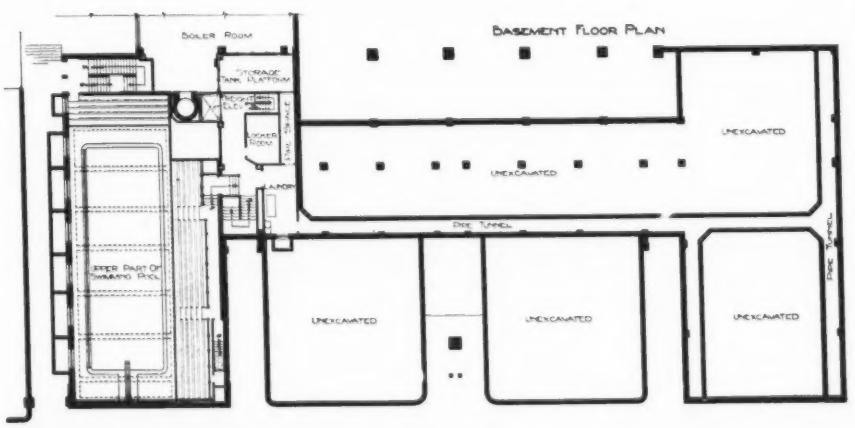
SECOND FLOOR PLAN



FIRST FLOOR PLAN

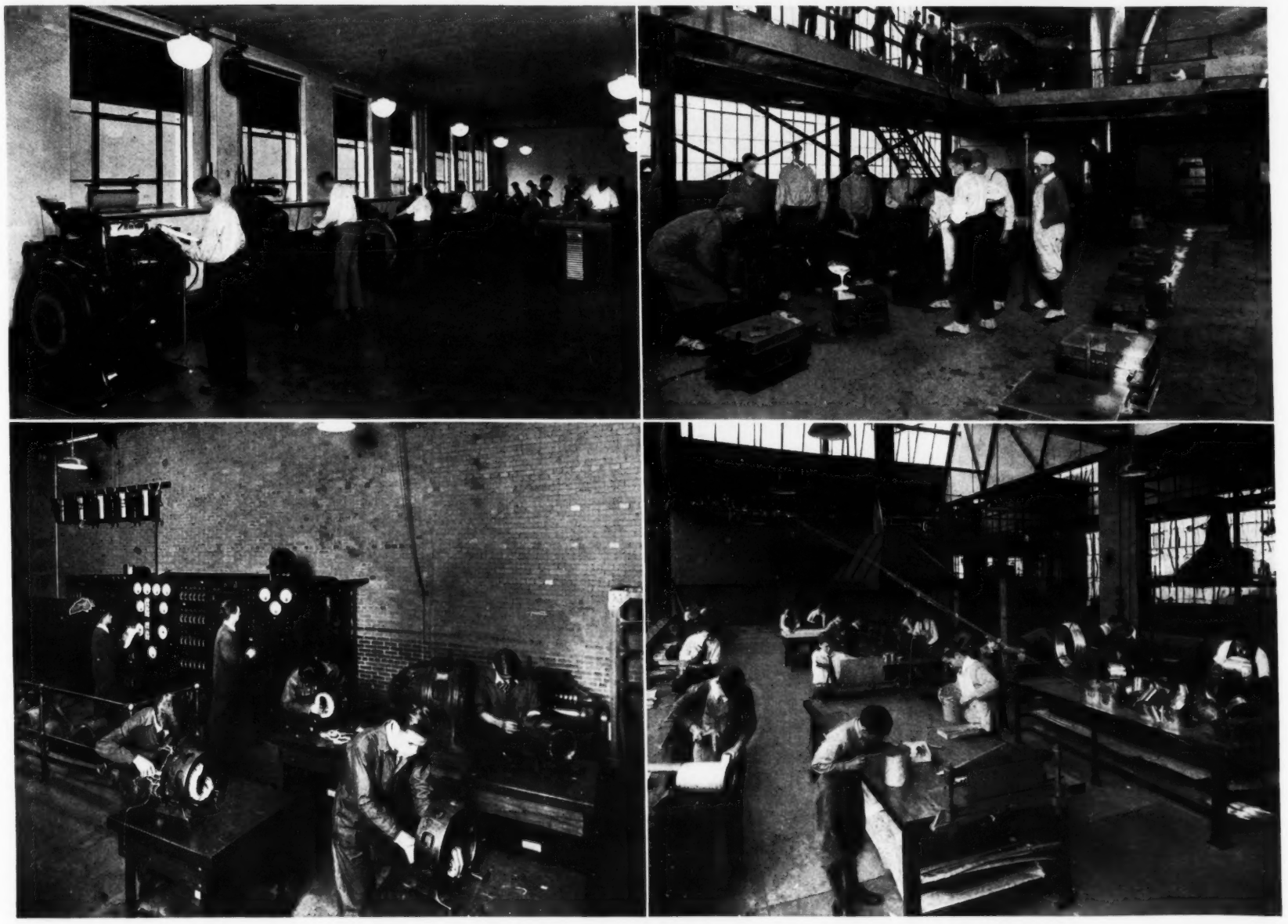


ENTRANCE FLOOR PLAN



BASEMENT FLOOR PLAN

FLOOR PLANS OF THE CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania



INTERIOR VIEWS OF THE CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania
TOP, Print Shop and Foundry; BOTTOM, Electrical Shop and Sheet Metal Shop

THE CONNELLEY TRADE SCHOOL FOR BOYS

In point of construction and equipment the Clifford B. Connelley Trade School for Boys at Pittsburgh, Pa., is one of the most modern and complete buildings of its type in the United States. It opened its doors September 1, 1930, to nearly 1,200 students.

The school, which has a total capacity of 1,600 students, is dedicated to Mr. C. B. Connelley, for many years a member of the Pittsburgh board of education, dean of the Carnegie Institute of Technology, and at present a city councilman.

The hilly nature of the city of Pittsburgh was used to excellent advantage in the design of this building, which consists of two units. The main section of six stories faces Bedford Avenue and houses an auditorium, a gymnasium, administrative offices, classrooms, laboratories, a cafeteria, and space for the commercial and printing departments.

Separated from the main structure by a wide driveway are the shops which are two stories high, finished in typical factory style and fitted with fenestra steel windows and saw-tooth skylights. The shop has several large entrances so that the largest-sized truck can be driven directly into the building to deliver or receive machinery, supplies, and finished goods. Unique features of arrangement and equipment have been built into each of the shops, which were designed by first setting up the educational requirements as seen by the department heads and instructors. Each of the layouts after it had been passed upon by the principal, was subjected to scrutiny by the executives of the vocational education department of the city schools before it was submitted to the architects. The service of Mr. James L. Bonar, superintendent of buildings of the board of education, was also used in the extensive preliminary studies. The unique character of the shops may be illustrated by the plumbing shop which is equipped with a deep well, in which a three-story house may be erected and completely equipped with plumbing.

List of Rooms
Clifford B. Connelley Trade School for Boys

Academic Buildings	*Shop Buildings*
17 Classrooms	6 Commercial Classrooms
1 General Office Suite	1 Bricklaying Shop
1 Medical Inspector's Office	1 Plastering Shop
	1 Plumbing Shop
1 Teachers' Room	1 Sheet-Metal Shop
1 Teachers' Locker Room	2 Machine Shops

(Concluded on Page 120)

MILLROOM, CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA
Edward B. Lee, Architect, Pittsburgh, Pennsylvania

TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS

Dr. Wallace E. Mason, President, Keene Normal School, Keene, New Hampshire

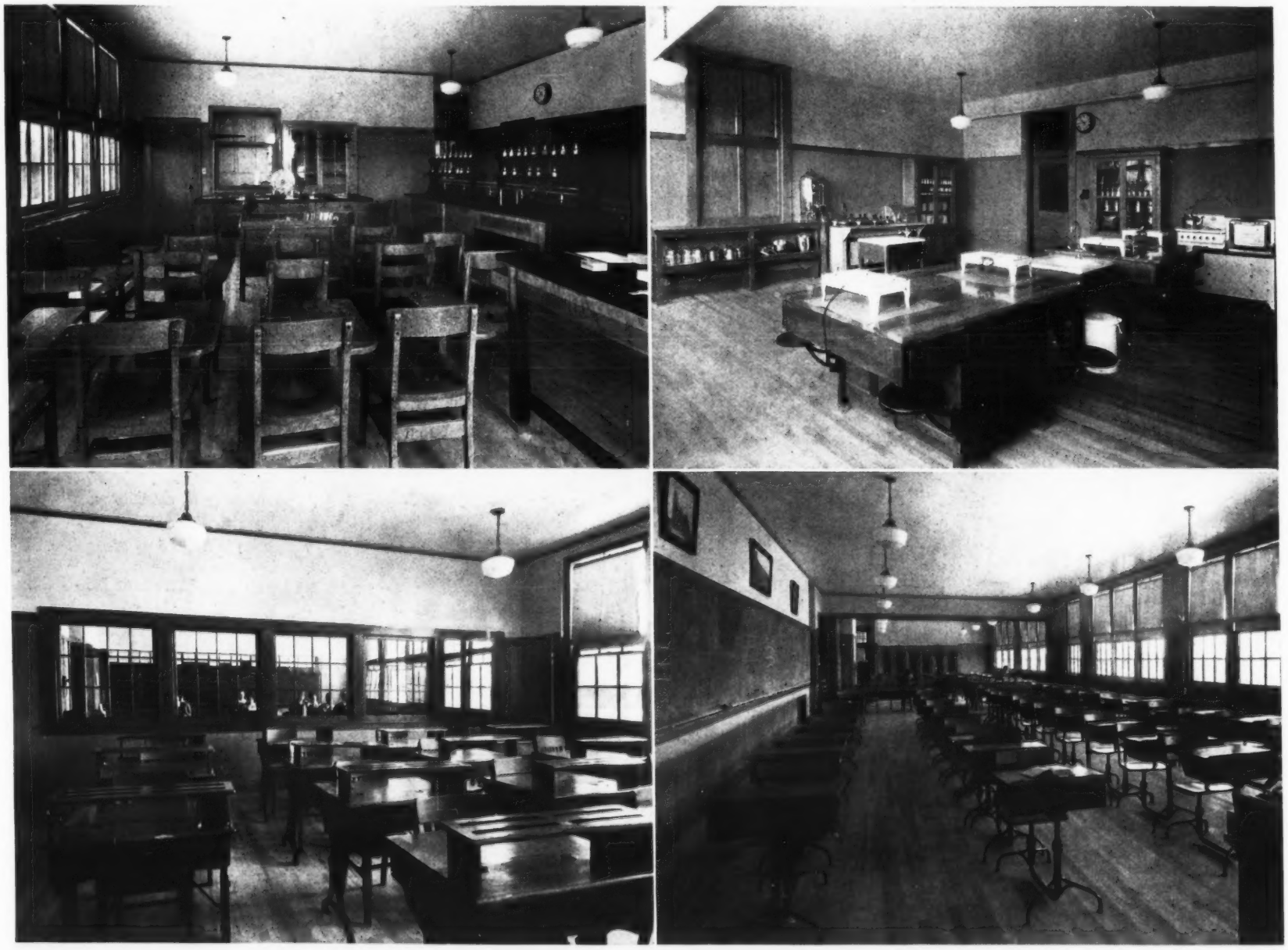
One of the latest and most complete consolidated schools of New England is the Tisbury School on Martha's Vineyard, planned by Haynes & Mason, architects, of Fitchburg, Massachusetts, and Hartford, Connecticut. On approaching the building one is impressed with the wisdom of the local board in the relation of a site on top of a hill where the windows of the building command a view in every direction of the beautiful shores and harbors of "The Blessed Isle" as Martha's Vineyard is called.

The dignified simplicity of the building is in keeping with the beauty of the site. Three stories in height, with the faculty and visitors' entrance at the front and student entrances at each end, the school is a building of which any town might well be proud. The entire school population of the town is housed in this building, the entrance floor being given over mostly to the grades and the upper story to the high-school students.

The first impression of the visitor as he enters the foyer, with its brown-linoleum floor and medium-ivory walls of rough plaster with faint tinges of pink and green, is one of pleasing harmony of color. At the left is a dignified board room and an adjoining superintendent's office, both furnished with mahogany tables, desks, filing cases and safe for school needs. At the right is the nurses' room with the dental office adjoining. The nurses' room, in addition to the necessary desk, is made attractive with a day bed, easy-chairs and drapery curtains all in harmonious colors and evidently planned to take away from the student the fear caused by the typical hospital style of furniture.

SEWING ROOM, TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS
Haynes and Mason, Architects, Fitchburg, Massachusetts

The grade rooms on either side of the corridor on this floor are equipped with the latest type of grade-school furnishings. The wood



INTERIOR VIEWS OF THE TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS
Haynes and Mason, Architects, Fitchburg, Massachusetts
TOP, General Laboratory and Cooking Room; BOTTOM, Bookkeeping Room and Study Room

TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS
Haynes and Mason, Architects, Fitchburg, Massachusetts

CORRIDOR

MAIN ENTRANCE

TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS
Haynes and Mason, Architects, Fitchburg, Massachusetts

trim, the desks and chairs, the beautiful grained panels, and the display boards above the blackboards with sliding strips for drawings, maps, etc., are all in harmonious shades of browns and tans tending to give a restful feeling to the scholars. The wardrobes in these rooms are concealed with sliding doors and rubber-tile floors. The ample closets with wide shelves would be a delight to any teacher.

The corridors are equipped with fire doors leading to broad stairs at either end of the building.

A double drinking fountain faces the entrance and on either side are the doors leading to the boys' and girls' toilets. An interesting feature of all lavatories in the building is the mixing valve which gives water of any temperature for washing hands and faces.

Recessed radiators give ample heat without obstructing the corridor space.

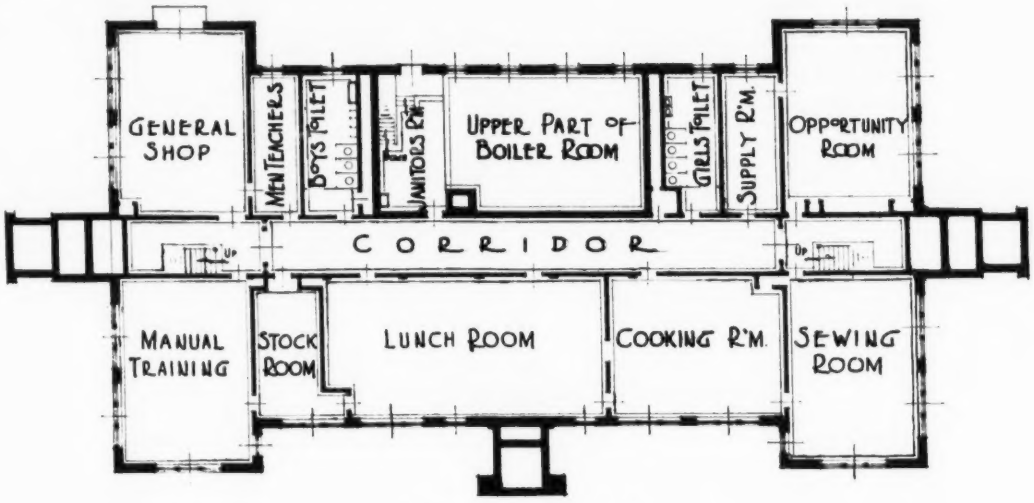
The bluestone stair treads and the stair trimmings furnished in briar green carry out the harmonious colors of the corridors with their light-brown tiles, dadoes and cream walls above.

Two rooms on this floor are arranged as a suite for the commercial department, with glass partitions between the bookkeeping and typewriting rooms, giving one instructor supervision of both rooms.

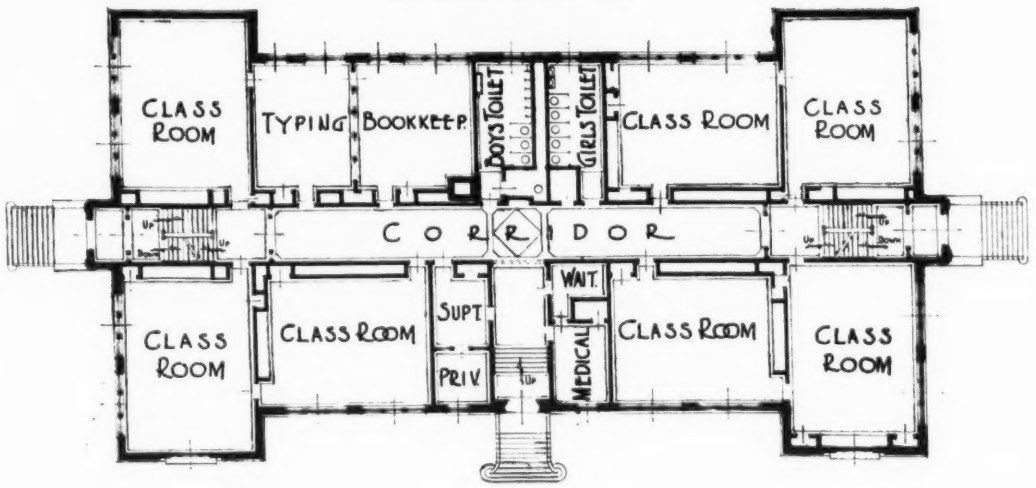
The corridors on the second floor have recessed metal lockers. Besides the necessary classrooms this floor contains a combined physics and chemistry room, modern science tables and an electric exhaust in hood, to carry off gases.

On this floor also is the generous-sized study hall, in the front of which hangs a colonial picture of the "beautiful isle" painted and donated

(Concluded on Page 140)

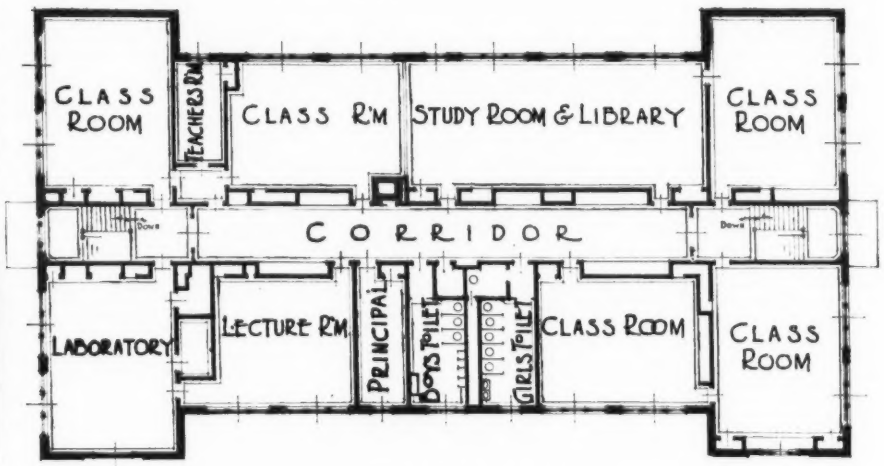


GROUND FLOOR PLAN



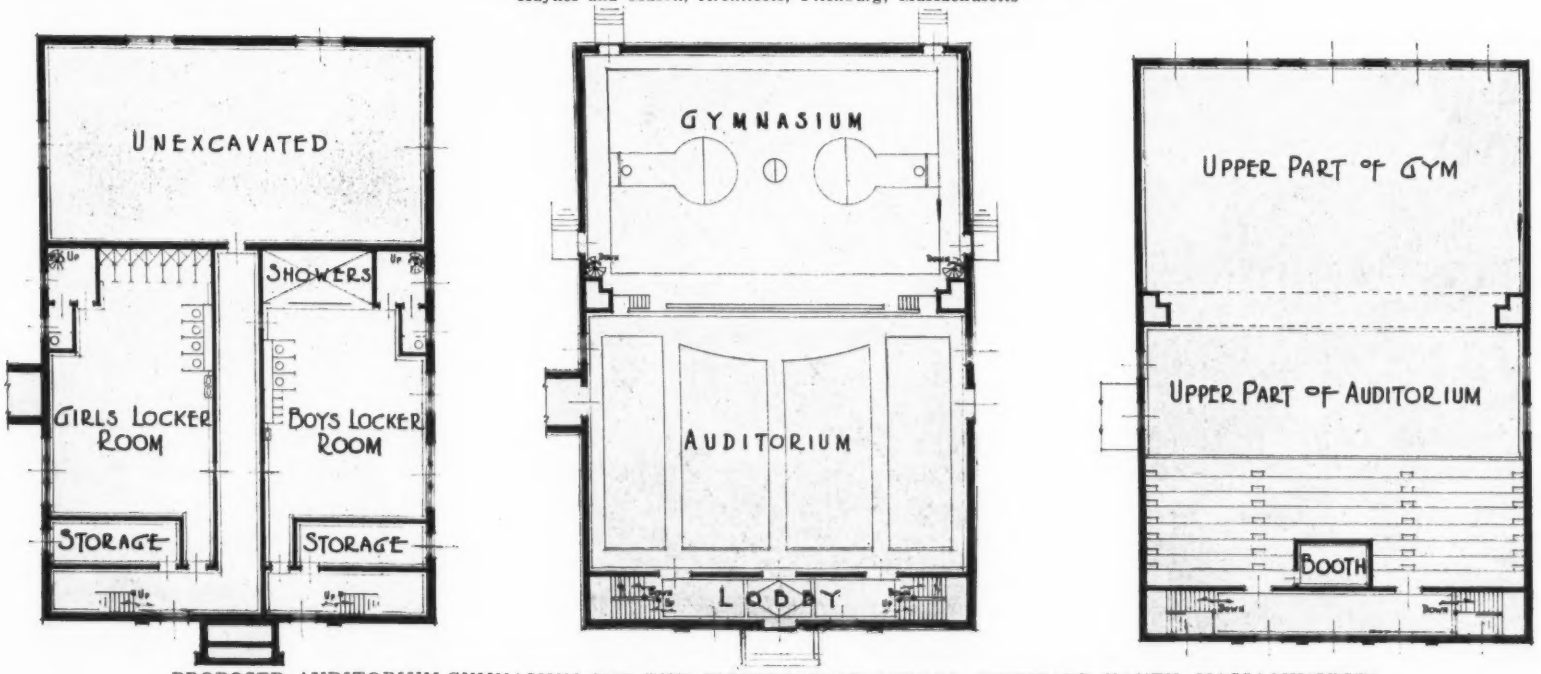
FIRST FLOOR PLAN

GENERAL SHOP



SECOND FLOOR PLAN

TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS
Haynes and Mason, Architects, Fitchburg, Massachusetts



PROPOSED AUDITORIUM-GYMNASIUM FOR THE TISBURY HIGH SCHOOL, VINEYARD HAVEN, MASSACHUSETTS

Buying School Buildings

N. L. Engelhardt, Associate Director, Division of Field Studies, Teachers College, Columbia University

Three major problems stand out among the many details which boards of education must consider in the planning and construction of school buildings. In these three phases of planning, the reasons for success and failure are discoverable. Careful attention given these factors, will tend to enhance considerably the degree of community approval and group satisfaction enjoyed by boards of education as a result of many hours of labor spent in building, planning, and development.

When an educational building is to be erected, the owner or the board of education should provide a complete statement of facilities needed and of spaces to be allotted each type of educational service. In the first instance, the architect is entitled to such a complete statement, as it makes possible the consideration of his time to the solution of the real problem. On the other hand, educational specifications clearly and definitely drawn give evidence of the care with which the board of education has approached its problem and make for the elimination of petty misunderstandings and friction between architect and employer. Educational specifications require much time and skill in their preparation. Whether $50,000, $100,000, or $500,000 are being expended upon a building, the architect's need for a complete statement of educational requirements exists. A review of scores of school-building plans in connection with recent state and city-school surveys, has pointed out the frequency with which buildings have been projected with apparently very meager statements of educational requirements and consequent serious bungling of the buildings themselves. A number of large cities in which school buildings are constantly being built have progressed far in defining their educational needs. The general character of their work may well be used as an example to be followed in cities where building occurs infrequently and, hence, less attention has been given this important problem.

Preparation of Educational Specifications

The architect is entitled to specifications drawn with such definiteness that he may experience no difficulty in comprehending the scope of the problem. Educational specifications may well include the number and character of rooms, their sizes, their auxiliary spaces, their orientation, and preferred relationship to one another. Preferred placements with reference to story levels, to special or regular exits, and to service connections should be stated. Room capacities, possible duplicate uses, nature of equipment, and demands of artificial and natural lighting are features the architect must consider at the outset of his planning. The importance to be accorded locations of special rooms, such as library, music rooms, offices, teachers' study, and the like, should be emphasized. Attention should be called to the probability that changing educational methods will necessitate future adaptations of the building to other educational conditions. It must be borne in mind that the radio, the sound picture, and perhaps television or other seeing or hearing devices, will make possible larger groupings for instruction and require subsequent moving of partitions. Sizes and capacities of the large units, such as auditorium, gymnasium, library, cafeteria, and special projection rooms, should be clearly stated. Room layouts prepared after careful study and consultation should accompany the general educational statement. Such layouts may be simply drawn but should be sufficiently inclusive to indicate all important points which have a bearing upon the general building plan. Educational specifications should tell in type what the architect will later evolve into permanent and beautiful form. Each hour spent in clarifying educational specifications will prove a real economy measurable not in dollars saved, but in hundreds or thousands of dollars, either actually saved or put to a more positive or a more complete use.

Adequacy and Character of Working Drawings

The second of the three major problems involved in school-building buying is concerned with the adequacy and character of the working drawings which represent part of the architectural service for which the board of education pays the professional fee. Working drawings form the basis for contractors' bids. The clearness and accuracy with which the architect's ideas have been put into these drawings will certainly have its effect upon the bids which contractors submit. If the drawings are incomplete or lacking in part, the contractor's tendency will be to "cover himself" in his bid. As a good business man he cannot do otherwise. State departments of education, through their building divisions, only rarely regulate the character and number of working drawings. Boards of education, in buying architectural service, must therefore give full consideration to local or individual practices. It is desirable to discover how exacting boards of education have been with reference to this phase of school-building purchasing.

Recently, in connection with a state survey, 127 sets of working drawings were studied intensively with special reference to the adequacy of the drawings and the completeness of the data furnished upon them. The plans were submitted in response to a request from the state superintendent of schools asking that copies of the blue prints and specifications of the most recently constructed schools be submitted. The 127 plans came from all types of communities and cities and probably represented a good cross section of the character of the architectural work done in the state. To study these plans a checking list was devised which followed in large part the Strayer-Engelhardt-Hart Architect's Form No. IV.[1] On this checking list there were approximately 47 different items which were concerned with the excellence or poorness of the drawings themselves, their completeness or inadequacy, and the amount of detail which they carried. Eleven of these 127 sets of plans, according to which buildings have been recently constructed, were so inadequate that it was impossible to check them against the items on the list. This meant that adequate architectural service was lacking in large measure when the money for these 11 buildings was being spent. The failure on the part of boards of education to provide adequate architectural service in these instances, without doubt, resulted in inadequate buildings, accounted for programs of repairs and maintenance far beyond what might have been needed in these cases. The remaining 116 plans were rated with reference to the items of the checking list on the basis of the following scale: "A" meaning excellent and superior work; "B" meaning a mediocre quality of work which might pass if it did not exist to too great a degree; "C" meaning such poor work that it ought never to pass board inspection or be utilized as part of the bases for bidding; and "X" referring to items which were omitted entirely.

[1]The Strayer, Engelhardt and Hart Schoolhousing Series. Published by C. F. Williams & Son, Inc., Albany, N. Y.

TABLE I. The Frequency With Which Working Drawings Carried Items Given an "A" Rating

Total Number of Items Rated "A"	*Number of Plans*
None	27
1 to 4	37
5 to 9	17
10 to 14	11
15 to 19	14
20 to 24	2
25 to 29	4
30 to 34	0
35 to 39	2
40 and above	2
Total Plans	116

Table I shows the frequency with which a rating of "A" was given these plans on the various items of the checking list.

This table shows that there were 27 of these 116 building plans in which none of the 47 items received an "A" rating. There were 37 additional plans in which fewer than five items, out of a total of 47, received an "A" rating. *There were only two sets of plans which were rated "A" on 40 or more of the 47 items.* Evidently, there is an exceedingly wide variation in the working drawings bought by boards of education. The checking list itself may have been severe in its demands. Architectural service in a state should, however, approach a degree of standardization in the character of the working drawings which is not evidenced in what these 127 boards of education purchased. As an illustration, only one quarter of the plans included plot plans, which showed that sufficient attention was given the location of the building upon its site and the other important factors of site planning, such as service connections, sidewalks, playground development, landscaping, and the like. Individual case studies were made of all of the working drawings included in this analysis. A typical case analysis reads as follows:

Case X. This is an excellent set of plans, complete in almost every detail. The plans contain subdivisions covering heating, ventilating, lighting, and plumbing.

The plan shows orientation of building, size of site, relation to surroundings, contour lines, and location of service mains.

The floor plans are in proper proportion, definite in measurements, clear in details, and show properly numbered rooms, complete schedules for floors, windows, and doors.

Section plans show longitudinal and lateral sections in detail.

Details of construction are shown on enlarged scales and plans for special appointments are clear and definite.

On the whole, this set of plans is such as to leave little doubt in the contractor's mind as to what the architect intended. Such plans reduce "extras" to the minimum and lessen the chance of cheapening the building through evasion or misconstruing.

This case represents one of the best sets of working drawings. The range from this to the poorest set of working drawings was so great as to suggest the necessity of action by the state department, or by the state architectural board, in setting up the nature of working drawings.

Table II shows the number of items of the checking list which were omitted on each of the 116 plans.

Three of the plans lacked 45 or more of the 47 items on the checking list. Seven of the plans lacked 40 to 44 items of the checking list. No set of plans contained all of the items, although three sets of plans lacked only 5 to 9 of the items, and two sets of plans lacked 4 or less of the items. One set of plans had omitted only two of the items of the checking list, showing

TABLE II. The Frequency With Which Items on the Checking List for Working Drawings Were Omitted Entirely in the 116 Plans of Recently Constructed Buildings

Total Number of Items Omitted	*Number of Plans*
45 or more	3
40 to 44	7
35 to 39	22
30 to 34	33
25 to 29	17
20 to 24	11
15 to 19	12
10 to 14	6
5 to 9	3
0 to 4	2
Total Plans	116

that the checking list itself did not make demands which were not recognized by the architectural profession.

Apparently, when a board of education purchases working drawings which determine the character of a school building, no adequate means is employed by the board of education of checking these working drawings to discover whether they meet the requirements which contractors must follow in estimating their bids. Dr. A. M. Proctor[2] has just recently concluded an intensive study in this field, showing that the conditions indicated above are representative of many states rather than of one state. Dr. Proctor suggests ways and means by which boards of education and executive officers may test the quality and character of their purchases when they are buying working drawings.

Checking the Specifications

Boards of education are confronted with a third important phase of buying when planning the erection of school buildings. This has to do with the character of the specifications submitted. Specifications may well be developed not to standardize the contents of a set of specifications, but to indicate the items which should be included, and the general form which specifications may take. Only 30 different complete sets of specifications were submitted in response to the request mentioned above. This may be evidence that boards of education and school administrators pay little attention to the character and contents of building specifications. Copies of such specifications were not available to submit for review.

A checking schedule for specifications was developed after an analysis of specifications of some of the best recently constructed school buildings in the country. Out of this study, 225 items were chosen to form the checking list, against which 30 different sets of specifications from recently erected school buildings in this one state were checked. No set of specifications included all of the 225 items set up in the standards. Half of the specifications disregarded at least 35 per cent of the items. Three sets of the specifications included, however, 85 per cent or more of the items. If boards of education are to purchase specifications which define the amounts that school buildings cost, there certainly ought to be some way in which school boards may discover the excellence of the specifications which are prepared. Costs are easily affected by the omission of items, by statements which are not clear, and by indefinite statements of contractual relationships.

The group of survey workers studying these specifications emphasized the following observations arising out of their analyses:

1. There is a definite need for standards with reference to writing specifications for school buildings. The American Institute of Architects has set up a standard form for the statement of general conditions. Several sets of specifications included this statement either directly or by reference. This printed form costs but little and it is difficult to understand why any architect should not include it *in toto*.

2. There is a tendency for architects to accept and refer to specifications of manufacturers of special articles, without including these specifications in the general specifications, and without making provisions for testing and for special adaptations to the particular job.

3. A standard list or index of specifications would be invaluable to architects as a guide to the writing of specifications. This would serve as a means of checking as to the inclusion of all important items and would guarantee the proper classification and arrangement of items as they occur in the specifications. Thus the matter of indexing would be greatly facilitated.

4. The specifications studied are particularly weak in statements of the scope of work. There is frequent recurrence of the phrase — "such things as are necessary to a complete and workmanlike job," or some similar phrase.

5. In many instances contractual relationships are so poorly defined as to leave many possibilities for disputes and misunderstandings and such compromises and agreements which may add to the cost to the owners and results in a very unsatisfactory building.

6. The right of the owner to make changes and alterations in the plans, and the methods of providing for the cost of the same, should be clearly set forth. In most of the specifications studied this clause is so worded that the owner would be practically at the mercy of the contractor, as to the cost of the same, if he decided to make any changes.

7. There is a tendency on the part of some architects to carry details only on the drawings, without repeating them in the specifications. It is exceedingly difficult to make a drawing self-explanatory and where explanations are not included in the specifications again, there is a loophole for the contractor to use his own judgment.

8. The general contractor is frequently under obligation to do certain construction work in connection with the work of the mechanical contractors. The specifications for such work are often carried in the special specifications, but omitted in the specifications for the general contract. It would seem that such items should be carried in both sets of specifications.

9. Indefiniteness of detail and lack of clarity in specifications make it difficult for bidders to estimate prices closely and will usually result in the inclusion of a contingency amount in the bid and thus increase the cost of the job.

10. Specifications in regard to provisions for waterproofing and dampproofing are especially weak and in many sets lacking altogether. Rarely are these found listed under one head and given adequate treatment. It would seem that this item is of sufficient importance to be given a special place and special significance. The statements as to methods of waterproofing are particularly inadequate.

Case studies were made of all of the sets of specifications submitted and each case was described briefly. Case X might be described as follows:

Case X. On the whole, these specifications are indefinite and meager in detail. Frequently, where it is evident that details are not clear, a warning is inserted, "Consult the architect before proceeding." The following is a good example of incomplete detail, "The front of the stage is to be wainscoted with 5/8-in. stuff and other details to complete the job." The details would have to be assumed unless they are carried on the blue print. One might also ask what is 5/8 in. stuff? Such generalities are characteristic of the entire set of specifications.

Case Y which rated high, represented a splendid purchase on the part of the board of education. The only comment noted was as follows:

Case Y. Practically a model set of specifications calculated to control the building operation throughout.

Thus, one school board apparently was able to get full return for the money spent for architectural service, while another board of education was buying in the dark.

The planning and construction of school buildings is a highly technical work. As boards of education undertake work in this field, every safeguard should be utilized as the work progresses. Three safeguards which have not been utilized sufficiently in the past are the three enumerated above: (1) setting up adequate educational specifications for the building; (2) analyzing working drawings to discover their adequacy and completeness; and (3) checking specifications to discover their conformity with the working drawings, and their completeness for the project in hand on which the board is spending many thousands of dollars.

Checking List for School-Building Plans Devised in Accordance With the Strayer-Engelhardt-Hart Architect's Form No. IV

File Number .....
City, Town, or District .....
Valuation ..... Tax Rate .....
Type of School: Elementary .....
Intermediate .....
High School .....

This set of plans includes:

1. Plot Plans .....
2. Floor Plans .....
3. Section Plans .....
4. Elevations .....
5. Details .....
6. Plumbing .....
7. Heating and Ventilating .....
8. Electric .....

Signed:

.....
.....

CHECKING LIST

Each item is to be rated A = Excellent; B = Mediocre; C = Poor; or X = Omitted.

SECTION 1. PLOT PLANS

1. The plot plan of site with the scale indicated on the drawing shall include: .....
2. The boundaries showing size and shape of site ....
3. The block plan of the proposed new building as it will be located on the site, together with an outline of any existing buildings and their location on the premises in relation to the proposed new building .....
4. The location of sewer, water, electric, and gas mains in the streets with their connections to the building .....
5. The location of sewage-disposal plant if such is to be installed, and location of light and power poles together with voltage and cycle .....
6. The block plan of the new building shall be clearly distinguished from other buildings or data shown in the drawing .....
7. The contours of the entire surface of the ground and the proposed finished grade at building. Elevations of sufficient points above an established datum to give clear idea of the configuration of the site .....
8. The points of the compass .....
9. The general description of property adjoining, and on the opposite side of the street. This is to include type of building and nature of its occupancy .....

SECTION 2. FLOOR PLANS

1. There shall be required a plan of each floor of the building and of the roof. For buildings less than 100 feet in the greatest dimension, these drawings must be made 1/4-inch scale. A plan of the foundation walls and footings shall be required in addition to those above mentioned unless such items can be shown on basement plan .....
2. If concrete construction is to be used, plans of all floors and roof where concrete is to be used shall be required and may be drawn at 1/8-inch scale. These plans shall indicate the location of all columns, girders, and joists, and a schedule of size of each, properly numbered, must be given on each drawing. (If necessary for a clear understanding of structural requirements, separate floor plans and roof plans, column schedules, etc., shall be furnished.) .....

[2]Proctor, A. M., *Safeguarding the School Board's Purchase of Architects' Working Drawings.* Doctor's Dissertation. Russell Library, Teachers College, Columbia University, 1930.

3. On all floor plans, all rooms, windows and doors must be numbered consecutively, as:
   Sub-basement, B–1, B–2, B–3, etc.
   Basement, 1, 2, 3, etc.
   First Floor, 101, 102, 103, etc.
   Second Floor, 201, 202, 203, etc.
   Throughout sections and elevations, and in specifications and correspondence, references to any or several rooms, windows or doors shall be made by number.....
4. All plans shall be completely figured so that sizes of rooms, thickness of partitions and walls, etc., can be readily determined.....
5. On the floor plan, there shall be a note or schedule of the kind of floor and base, material and wainscot and finish of room. If the building is not of fireproof construction, the direction and size of joists in each ceiling shall be indicated, unless shown on structural plans.....
6. Each floor plan shall show:
   (1) Section lines, indicating planes parallel to which drawings called for in Section 3 below are made, (2) the swing of all doors. The size of each door shall be marked. Glazing and transoms shall be noted, unless shown by detail drawings, (3) the interphone system, (4) the location of drinking fountains, (5) blackboards, (6) bulletin or display boards, (7) the location of master clock, (8) the location of fire alarm boxes and gongs, (9) the location of electric base and floor plugs, (10) hatching for all tile, brick, stone, and concrete shown in section on plans so that they are readily distinguishable, (11) on ground or first-floor plan, a key to materials and a compass, (12) teachers' closets or storeroom.....
7. A schedule shall accompany all floor plans, showing:
   (1) The number of each room, (2) the name and purpose of each room, (3) the dimensions of each room, (4) the number of windows of each dimension, (5) the net glass area, (6) the ratio between the net glass area and floor area.
   Such schedule shall be in tabular form and shall be so arranged that for each column or row filled in by the architect, there shall be a blank column or row to be filled in by the checking authorities .....

SECTION 3. SECTION PLANS

1. There shall be at least two sections through the building at the same scale as the floor plans.
   At least one section line shall pass through the main stairway from the lowest to the highest level. All sections shall show the finished floor and ceiling levels. At least one longitude and one cross section are desirable. A datum line with plus and minus height above and below shall be shown .....
2. If there are floors or ceilings at various levels, such sections or notes shall be made as will adequately show them and their relation to the levels of the main floors and ceilings. At least one end of each section line shall pass through the windows of each story.....
3. If there is an auditorium or a gymnasium, or if there are any rooms for mechanical equipment or moving-picture machines that cannot be shown on the two main sections, then such other sections as may be necessary shall be made.....
4. On all sections, the rooms through which the section line passes shall be numbered as on the plans. Doors and windows through or in front of which the section line passes must be numbered as on plans.....
5. There shall be indicated on all sections, either by elevations or sections:
   a) All of the items under Section 1–6, when possible .....
   b) The different materials used for wall and ceiling construction, or finish, as plaster, wood, brick, marble, tile, etc.....

SECTION 4. ELEVATIONS

1. At least four elevations of each building shall be shown, drawn at the same scale as the plans, or to a larger scale as may be desirable in special cases. One half of each, when symmetrical, may be in outline only, if desired. The finished half shall show cornice, windows, belt courses, etc. The material used for the various parts of the exterior of the building, such as stone, brick, metal, wood, etc., shall be clearly indicated.....
2. The floor level shall be clearly indicated on at least one end of each elevation.....
3. All windows and door openings must be numbered as on the plans.....

DR. BEN G. GRAHAM
Superintendent of Schools-Elect,
Pittsburgh, Pennsylvania.

SECTION 5. DETAILS

1. Details at ½ inch, ¾ inch, 1½ inches or 3 inches, of all construction, finish and equipment are required. Typical windows shall be shown by plan, elevation, and section at a large scale. All different types of windows shall be detailed at a scale of not less than ¾ inch. These details shall be completely figured so as to permit the clear glass opening of each type to be readily determined, together with the distance of the sill above the finished floor and the head below the ceiling..
2. The elevation and plan of the various types of doors shall be shown at a scale of not less than ¾ inch. In addition, full-sized details of doors, frames, and trims shall be shown.....
3. Details of cupboards, instrument cases, apparatus room and pantry equipment, etc., where included in the contract, shall be shown at a scale of not less than ¾ inch. Their elevations may be made at ¼-inch scale.....
4. Complete details of a main stairway shall be shown at a scale of not less than ¾ inch. String, newel, tread, riser and platform construction shall be clearly indicated thereon. Such details shall be completely figured.....
5. Moving-picture booth, if any, must be completely detailed in respect to construction and finish, and comply with the requirements of the National Board of Fire Underwriters.....
6. The character of blackboard installation shall be drawn at a scale of not less than ½ inch. The shape and construction of chalk rail shall also be shown .....
7. A typical detail of the finish of the floor and wall of vent ducts in schoolrooms shall be shown at a scale of not less than ½ inch.....

SECTION 6. PLUMBING PLANS

For all plumbing installations in school buildings there shall be required:

1. The plan of basement at a scale of not less than ⅛ inch, showing the complete drainage sytem inside of the building, together with indication of points at which stacks and rain-water leaders rise. The size of all pipes, location and type of traps, location of cleanouts, etc., shall be shown, as well as the connection to main soil line of all basement fixtures and their vent lines.....

SECTION 7. HEATING AND VENTILATING

For all heating and ventilating installations in school buildings there shall be required:

1. A plan of basement and all floors, including attic, at a scale of not less than ¼ inch to the foot, with the following exception: In buildings more than one hundred feet in greatest dimension, a ⅛-inch scale may be used if desired. The plan shall show exact location and all connection of all mechanical apparatus pertaining to the system.
2. At least one cross section of the boiler room and fanroom, showing all connections to and from boiler, heater, and fan, with piping, valving, and dampers shall be required.....
3. Plans shall show in detail any feature or connection concerning which there may be any doubt as to construction.....
4. All steam valves shall be specifically designated on plans and described in specifications.....
5. All valves in the boiler room or wherever steam is to be used at a pressure greater than 5 pounds shall have brass tags with an explanation of their use. See specifications.....
6. All dampers in ventilating systems shall have brass tags with an explanation of their use. See specifications.
7. Plans shall show, or a schedule shall contain, the following data:
   a) The total square feet of exposed wall, including glass of each room.....
   b) The cubic contents of each room.....
   c) The amount of direct radiation at base of flues in a gravity system.....
   d) The amount of indirect radiation at base of flues in a gravity system.....
   e) The sizes of all heat ducts and ventiducts....
   f) The amount of radiation in tempering heaters and reheaters in a fan system.....
   g) The size of fresh-air-intake openings.....
8. Specifications must state:
   a) The type and size of boiler or boilers.....
   b) The type and size of fans and normal speed of such fans .....
   c) The velocities through heater, horizontal ducts and vertical risers in a fan system.....
   d) The type of airwasher and humidifier, if any..
   e) The type of thermostat control, if any.....
   f) The type of vacuum system, if any.....
9. A key to all symbols used must be given on each set of plans.....

SECTION 8. ELECTRICAL PLANS

1. Each floor plan is reproduced showing the electric current available for all rooms.....
2. Check if electric current is provided for (1) lighting, (2) signal systems, (3) cleaning, (4) radio, (5) projection machines, and (6) for use in the laboratories .....
3. Plans should be checked for the building telephone system, as well as for direct connections with the outside telephone.....
4. Plans should be checked for provisions for motors in connection with all ventilating units and all shop units in which motors can be used.....
5. Check for the location of switches.....
6. Key to all electric symbols is shown on the plans.

Summarize briefly but definitely your judgment concerning these plans.

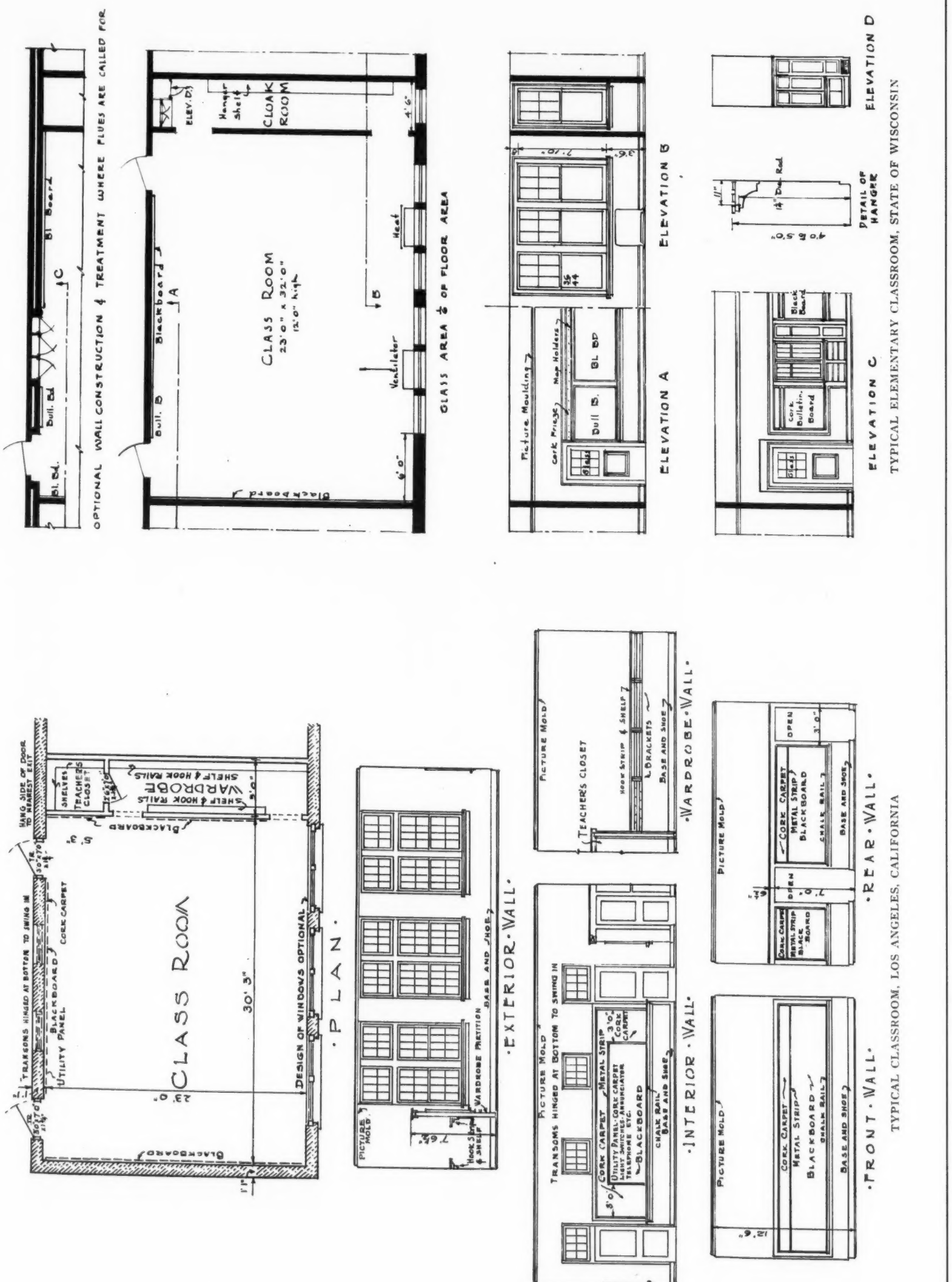
DR. GRAHAM BECOMES SUPERINTENDENT AT PITTSBURGH

Dr. Ben G. Graham, who was recently elected as superintendent of schools at Pittsburgh, Pa., succeeds the late William M. Davidson. Dr. Graham is a native of western Pennsylvania, and was graduated from the New Castle High School and from Westminster College with the A.B. degree. He also holds a master's degree from the University of Pittsburgh, and a doctor of science degree from Westminster College.

Dr. Graham began his teaching career in the rural schools of Lawrence county, and after three years' experience became supervising principal in a school at New Wilmington. In 1904, Dr. Graham was made principal of the high school at Canonsburg, and subsequently became a teacher in the Washington and Jefferson College. He then became principal of the Greensburg High School, and two years later he went to Pittsburgh as a teacher of chemistry in the Central High School. In 1916, Dr. Graham was made principal of the Latimer Junior High School, and the next year was made principal of the Irwin Avenue Junior High School. In 1919, Dr. Graham was elected superintendent of schools at New Castle, a position which he held for six and one-half years.

In 1926, upon the recommendation of Dr. Davidson, the school board appointed Dr. Graham associate superintendent of schools, on the superintendent's staff. In 1928, upon the resignation of Dr. Foster, Dr. Graham was named first associate superintendent. Later he was placed in charge of the high schools.

Following the death of Dr. Davidson, Dr. Graham was named acting superintendent of schools, and later became head of the school system.


OPTIONAL WALL CONSTRUCTION & TREATMENT WHERE FLUES ARE CALLED FOR
Bl. Bd.
Bull. Bd
Bl Board
C
CLASS ROOM
23'0" x 32'0"
12'0" high
Blackboard
A
Bull. B
Blackboard
ELEV. D
Hanger shelf
CLOAK ROOM
4'6"
Heat
B
Ventilator
6'0"
GLASS AREA 1/5 OF FLOOR AREA
Picture Moulding
Cork Frieze
Map Holders
BL BD
Bull B.
Glass
ELEVATION A
ELEVATION B
ELEVATION C
ELEVATION D
DETAIL OF HANGER
Black Board
Cork Bulletin Board
Glass
14" Pipe Rail
TYPICAL ELEMENTARY CLASSROOM, STATE OF WISCONSIN
HANG SIDE OF DOOR TO NEAREST EXIT
TRANSOMS HINGED AT BOTTOM TO SWING IN
SHELVES
TEACHER'S CLOSET
SHELF & HOOK RAILS
WARDROBE
BLACKBOARD
CORK CARPET
BLACKBOARD
UTILITY PANEL
CLASS ROOM
30' 3"
DESIGN OF WINDOWS OPTIONAL
·PLAN·
PICTURE MOLD
WARDROBE PARTITION
BASE AND SHOE
·EXTERIOR·WALL·
PICTURE MOLD
TEACHER'S CLOSET
HOOK STRIP & SHELF
L BRACKETS
BASE AND SHOE
·WARDROBE·WALL·
PICTURE MOLD
TRANSOMS HINGED AT BOTTOM TO SWING IN
CORK CARPET
METAL STRIP
UTILITY PANEL-CORK CARPET LIGHT SWITCHES-ANNUNCIATOR TELEPHONE ETC.
BLACKBOARD
CHALK RAIL
BASE AND SHOE
·INTERIOR·WALL·
PICTURE MOLD
CORK CARPET
METAL STRIP
BLACKBOARD
CHALK RAIL
BASE AND SHOE
·FRONT·WALL·
PICTURE MOLD
CORK CARPET
METAL STRIP
BLACK BOARD
OPEN
CORK CARPET
METAL STRIP
BLACKBOARD
CHALK RAIL
BASE AND SHOE
·REAR·WALL·
TYPICAL CLASSROOM, LOS ANGELES, CALIFORNIA

Classroom Comparisons

Samuel A. Challman, State Director of Schoolhouse Planning, St. Paul, Minn.

Every elementary-school building, simple though it may seem at first glance, presents a problem, the solution of which involves the consideration of a number of factors. Among these the educational, the architectural, the engineering, and the sanitary features are the most important. When building costs were low and the elementary curriculum, relatively speaking, free from complexities, the problem could be quite satisfactorily met. But, with the high cost of construction, the enriched curriculum, and the different types of school organization now developed, the problem presents a more difficult aspect.

Before proceeding very far, it becomes quite apparent that no general plan, or any uniform standards, can be laid down that will fit all elementary schools. Each type of school represents, or should represent, a fundamental idea as to the educational service which it seeks to render. The standards for the service to be given will naturally vary with the type of school established. But, at no time should the object of having a school fit the educational needs of the community be lost sight of.

Our Changing Practice

On the other hand, restrictions in planning which do not allow for a certain degree of flexibility in the use of rooms are likely to prove embarrassing. The educational practices of today may not be those of tomorrow. The primary room of today may be assigned to the sixth grade tomorrow. What is taught by the classroom teacher today may be taught by the radio tomorrow. All of which indicates that no matter how well we try to care for the conditions of today, we cannot hope to meet satisfactorily the conditions which are likely to confront us on the morrow.

According to information furnished by the U. S. Office of Education, there are approximately 22,800,000 pupils in the elementary schools of the country. About 1,300,000 of these are attending special schools in which the newer ideas with regard to educational training are being developed. The great number, practically 21,500,000, are in attendance upon the established conventional schools which adhere to the generally accepted form of school organization found throughout the country. For this great mass of children it is essential that the physical conditions be made as hygienic, comfortable, safe, and sanitary as possible. They are at an age when they are susceptible to conditions which undermine health, and affect mental attitudes, social contacts, and moral standards.

A Study of Classrooms

Millions of children are already housed as advantageously as our knowledge of proper conditions permit, but other millions are attending schools, both in urban and rural districts, which are far from giving childhood the opportunities and facilities for physical and mental development to which they are entitled. In order to have a basis on which to compare the various conditions which should be observed in the planning of new elementary-school buildings, the National Council on Schoolhouse Construction has collected from various cities and states typical plans of elementary classroom units. Six of these are herewith presented as indicative of the features which, in the estimation of those charged with the preparation of plans, have been deemed important.

As a mere floor plan gives only a partial conception of the classroom, it will be noted that elevations of the inside walls and partitions have been included. In this way the various features may be better visualized and the location of equipment indicated. A study of these plans will show a general acceptance of most of the features incorporated in the plans, but considerable diversity in the way they are made available.

General Dimensions Vary

In the matter of dimensions of schoolrooms, it should be noted that Chicago, for example, makes seating provision for 48 pupils in 6 rows of seats, with 8 seats to each row. The dimensions of its typical elementary class are 30 ft. 7 in. by 24 ft. 3 in. by 13 ft., which means a floor area per pupil of 15.4 square feet. The State of Minnesota in its typical classroom limits the seating capacity to a maximum of 40 pupils. The dimensions of its largest classroom are 30 ft. by 22 ft. by 12 ft. This allows for 5 rows of seats, with 8 pupils to each row. It provides 16.5 square feet per pupil. The State of New York makes its typical classroom slightly larger. Its actual maximum dimensions are 30 ft. 2 in. by 23 ft. 2 in. by 12 ft. The pupils are seated in 5 rows of seats, with 8 seats to each row. The floor area per pupil is 17.4 square feet.

As to the number of doors from corridors to classroom, the cities of Chicago and Los Angeles and the State of Wisconsin require that there shall be two, located near each end of the room, while the city of Rochester and the States of Minnesota and New York call for only one, and this near the front end of the room. Five of the plans show glass in the upper part of the door while the sixth, the city of Los Angeles, does not appear to consider this feature material. On the other hand, Los Angeles has transoms over each door and breeze windows in the partition between the corridor and the classroom. The other five plans show no such windows or transoms. This may be readily explained by climatic conditions prevailing in the various places.

Clothes Lockers and Storage Cases

In providing facilities for hanging the children's outer garments, Chicago installs lockers between the corridor and the classroom partition, Rochester uses sectional wardrobes equipped with doors opening directly into the classroom, the State of New York wardrobes or coatrooms, and the city of Los Angeles and the States of Minnesota and Wisconsin coatrooms.

When it comes to bookcases and supply cabinets, there appears to be considerable variation. Each of the plans, however, show provision of some kind for books and supplies. The distribution system in the various schools very likely affect this feature materially.

Bulletin boards are shown in each of the 6 plans. This feature has become quite general in elementary schools, during recent years, and space provisions for the same have been gradually increasing.

QUANTITY VS. PRICE

"All works of quality must bear a price in proportion to the skill, time, expense, and risk attending their invention, manufacture, and installation. Those things called dear are, when justly estimated, the cheapest. A composition for cheapness and not for excellence of workmanship is the most frequent and certain cause of the rapid decay and entire destruction of arts and manufacture."—Ruskin.

Blackboards are an important part of the elementary-classroom equipment. Chicago, Los Angeles, and the State of Minnesota apparently use all available wall space, except the window wall for blackboards. The States of Wisconsin and New York restrict blackboards to the front wall and the wall opposite the windows. Rochester uses swinging blackboards, four in number, on the front wall and runs a blackboard across the rear wall. The amount of blackboard needed in elementary classrooms is at present a much mooted question.

Heating and Ventilation Practice

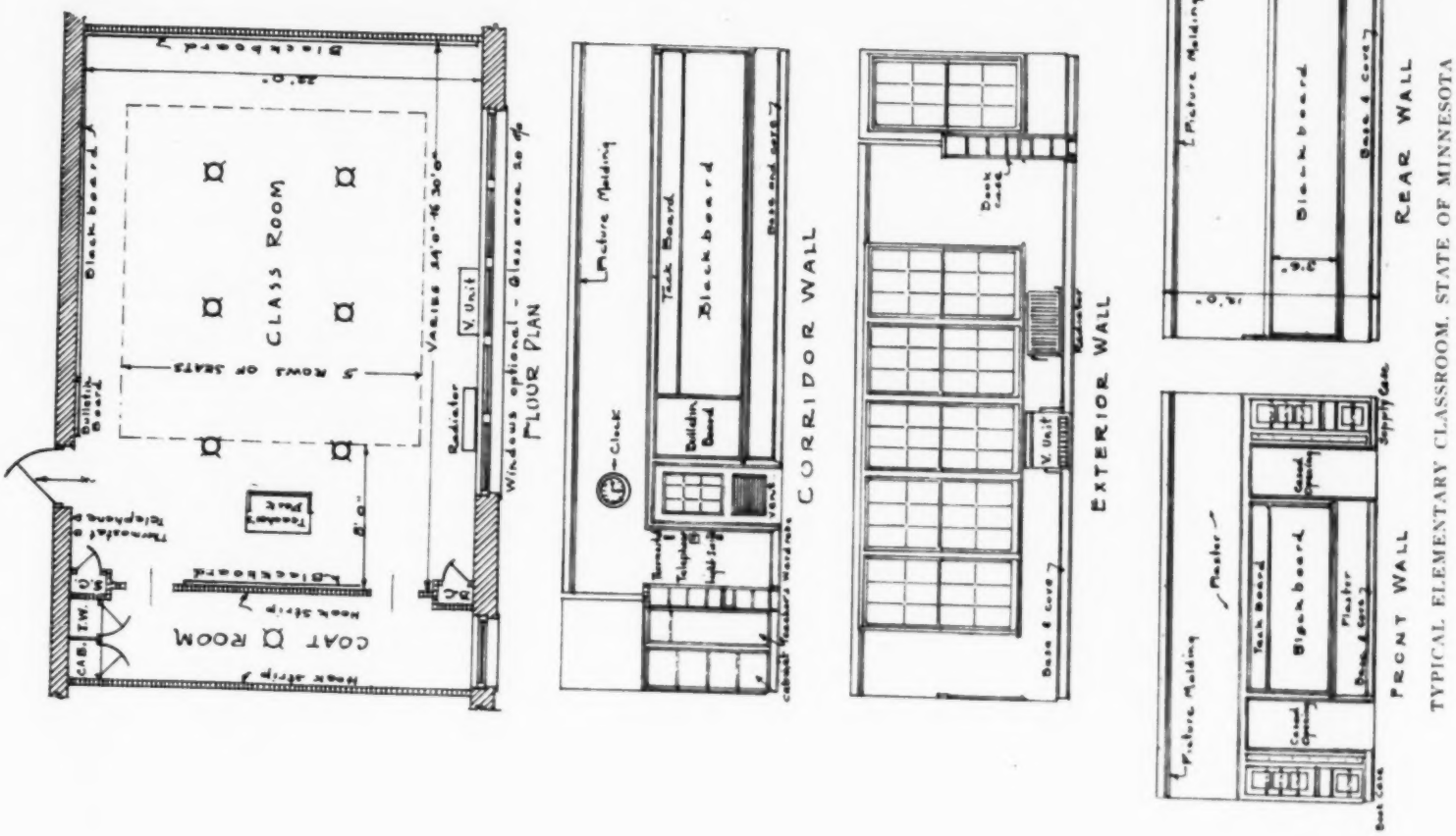
In Chicago, the heating and the ventilation systems are combined, and all elementary classrooms are heated by an indirect system supplying heated air with 6 air changes per hour for each classroom. Heat and vent flues are located in the interior wall between the corridor and the classroom. In Rochester and in the States of Minnesota, New York, and Wisconsin direct radiation is used, and a supply of air is provided by means of unit ventilators placed along the window wall in each room. In Rochester and in the State of New York, the air is vented through the wardrobe into a vent flue. In Wisconsin it is vented through a flue located in the cloakroom, while in Minnesota, corridor venting is general in buildings erected within the past three years. Thermostatic control is now so common as to call for no comment.

The plans also reveal that provision is being made for the installation of radio with loudspeakers in each classroom. What changes this is likely to bring about is an interesting question. Other minor features which add to the serviceableness of the building are the clock, the telephone, and vacuum outlets.

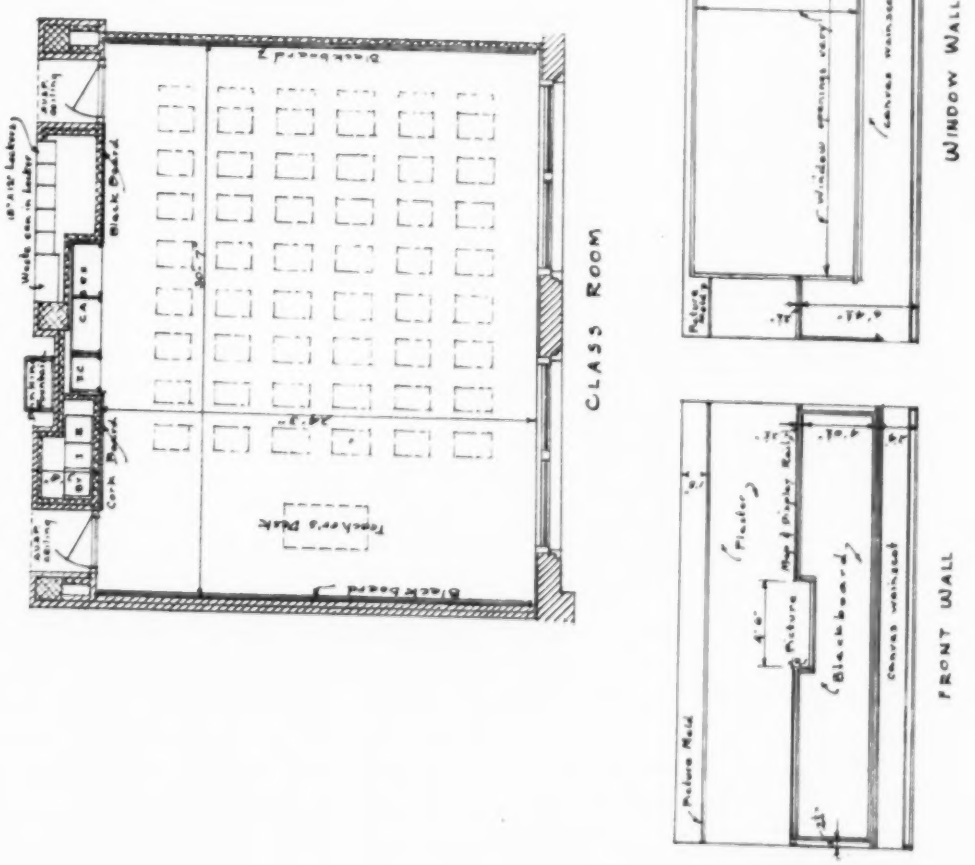
It is generally conceded that natural lighting of classrooms should be unilateral. Either 4, 5, or 6 windows, according to architectural design, supply the amount of glass area considered necessary. The amount ordinarily varies between one fourth to one sixth of the floor area, and this requirement has been observed in the plans shown. The artificial illumination is indicated on only three of the plans, but is also provided in the other three. The amount of artificial illumination required is still a matter concerning which there is no agreement, but an illumination of 5 foot candles at each desk, without objectionable glare and with good distribution, has been suggested by the Illuminating Engineering Society as a minimum requirement, while the recommendation is made that 10 foot candles would be preferable in classrooms.

More Study Needed

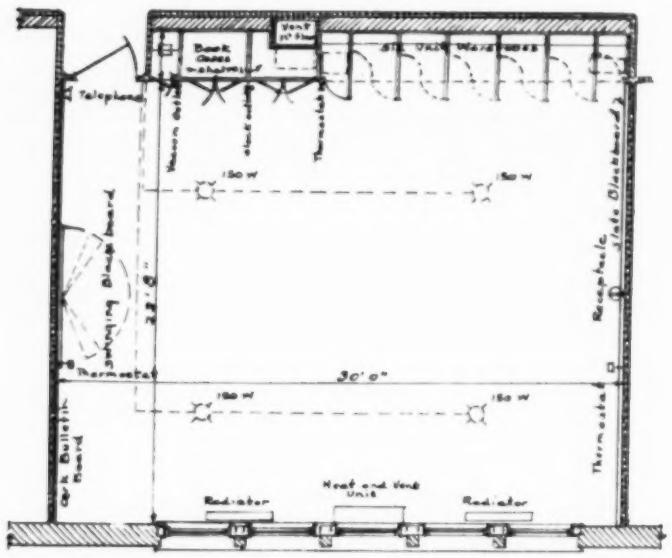
While the plans herewith presented are few in number and do not offer sufficient basis for any important deductions, they nevertheless represent what has been found by observation, and investigation to be conducive to the best interests of children, in the light of our present knowledge. Some philanthropic agency could render an invaluable service to childhood by financing a research into the problems of proper elementary-school conditions. Such an inquiry should be broad enough in its scope to consider most merely the physical, the physiological, the moral, the social and other aspects of the case, but should include the development of the whole child, not only in school, but also outside of school. Until such time as this can be done we shall have to content ourselves with hobbling along as we have in the past, adhering to the good that we have discovered, and eliminating the errors that we have made.



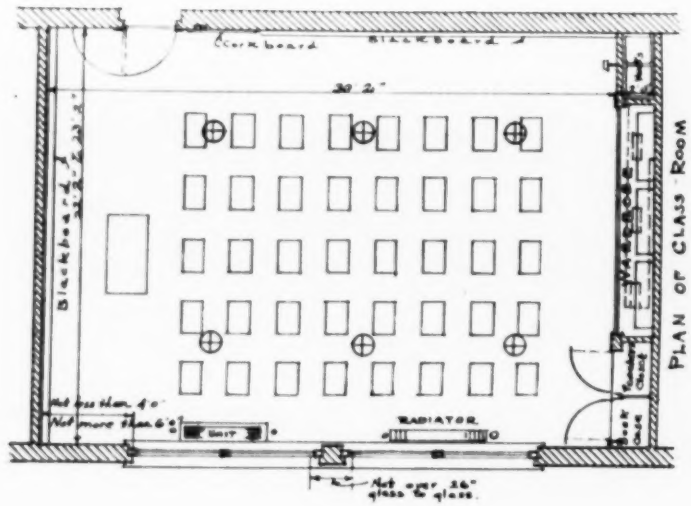
TYPICAL ELEMENTARY CLASSROOM, STATE OF MINNESOTA

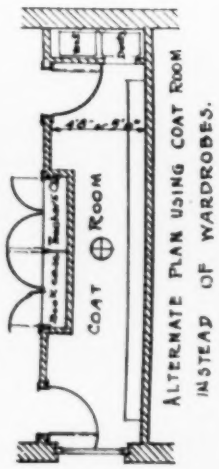


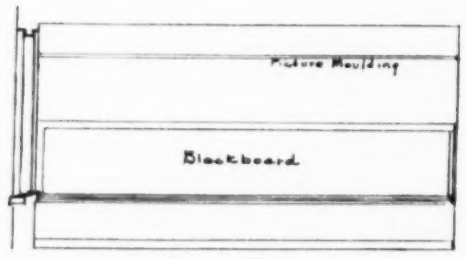
TYPICAL CLASSROOM, CHICAGO, ILLINOIS



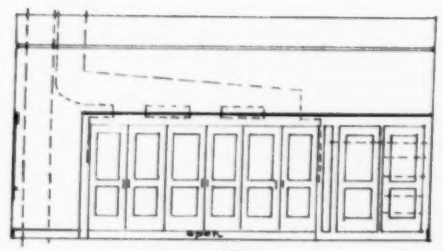
CLASS ROOM



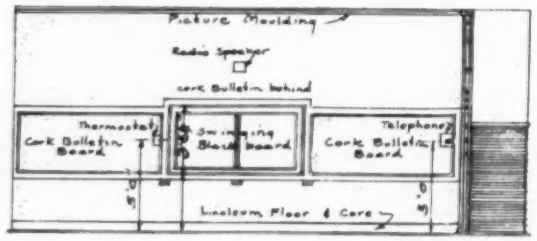




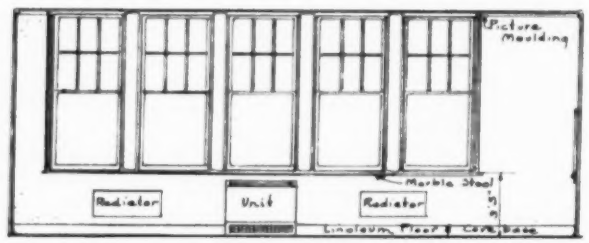
FRONT WALL



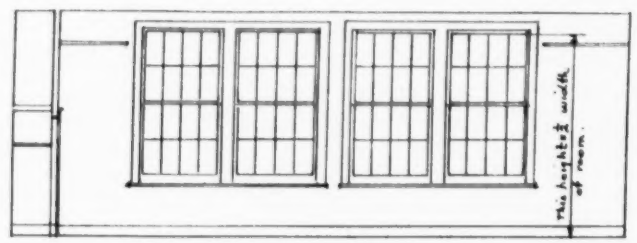
REAR WALL



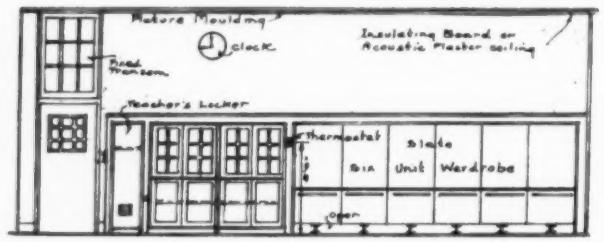
FRONT WALL



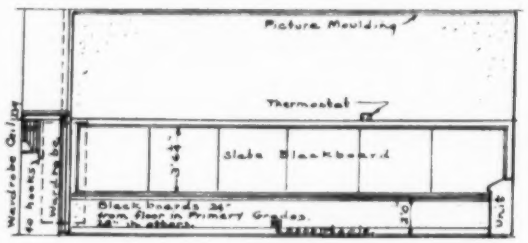
WINDOW WALL



LEFT HAND WALL

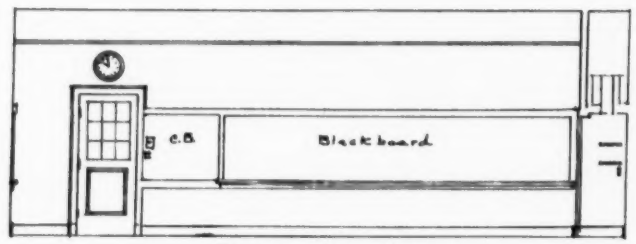


CORRIDOR WALL



REAR WALL

TYPICAL CLASSROOM, ROCHESTER, NEW YORK



RIGHT HAND WALL

TYPICAL ELEMENTARY CLASSROOM, STATE OF NEW YORK

The Plan of the High-School Commercial Unit

Rhue E. Green

Commercial training has experienced a greater growth in recent years than any other division of secondary education. High-school administrators and commercial teachers are almost unanimous in setting up as the immediate aim of commercial education, the general preparation for business careers. With this aim in mind, these administrators have made important changes in the high-school commercial program, principally in respect to the variety of courses offered in the department. With these changes has come the necessity of a well-developed physical plant, suitable in all respects for carrying out this extended commercial program. The present investigation purposes to determine the extent to which the commercial units are making these building and equipment provisions.

One hundred twenty-five of the largest high schools in twenty North Central states have coöperated in furnishing the data here presented. These larger high schools seem to offer a greater range as well as a more desirable list of practices as employed by high-school principals. The report is limited to the physical plant and the equipment provided.

Location of Commercial Unit. Administrative officers of these larger high schools are apparently appreciating the benefits which accrue to the entire institution by having the department located in a unit, very near the center of the plant, and in close connection with the administrative offices. This arrangement enables the commercial department to supplement the regular clerical help in the offices. Such a location further makes possible the operation of such features as the high-school bank, bookstore, student-activities association, in their logical connection, as a part of the commercial department.

Fifty-five per cent of the high schools have the commercial rooms located as a unit, and 62 per cent are reported to be centrally located in the high-school building. Of those having a centrally located unit, the prevailing floor is the second, since 72 per cent are so reported.

Rooms Included. Table I lists the rooms included in the commercial departments. These are distributed according to the number of students enrolled in the commercial departments of the schools. The table shows that 12 of the schools enroll fewer than 200, while 44 enroll more than 600 in the commercial departments. The median enrollment in the department is 475 students. Three rooms are found in all the units, namely, bookkeeping laboratory, typewriting room, and stenography room. The universal presence of these rooms indicates that the subjects provided for are basic in the commercial department. At least one commercial recitation room is provided by 95 per cent of the schools. Such a room is used for commercial geography, arithmetic, and law, and related subjects. As many as 86 per cent of the replies show that other academic classrooms are used for commercial classes during the day. An additional commercial laboratory as found in 29.6 per cent of the schools, combines the office practice training, banking, and similar types of commercial work.

TABLE I. Number of High Schools According to Enrollment in Commercial Department Having Various Rooms in the Commercial Unit

Type of Room	Number According to Commercial Enrollment: Less Than 200	201–300	301–400	401–500	501–600	Over 600	Total Number Schools
Bookkeeping Laboratory	12	23	20	12	14	44	125
Typewriting	12	23	20	12	14	44	125
Stenography	12	23	20	12	14	44	125
Commercial Recitation	10	21	18	12	14	44	119
Instructors' Office	3	8	10	7	7	24	59
Bank	2	7	8	7	8	12	44
Commercial Laboratory	2	8	7	6	4	10	37
Store and Supply Room	1	3	2	1	2	12	21
Total Number Schools in Each Group	12	23	20	12	14	44	125

Number of Rooms. These schools vary considerably in the ratio of number of rooms devoted to commercial subjects to the number of students enrolled in the department. Table II points out the practices as found. The median number of enrolled pupils per room used for the commercial department is 34 for the entire group. This same median is quite consistent for the various groups of schools based on their enrollments in the commercial departments. The median is largest in the schools enrolling more than 600 pupils in that department.

TABLE II. Number of High Schools According to Enrollment in Commercial Department Per Room Provided in that Unit

Number Pupils Per Academic Room	Number According to Enrollment: Less Than 200	201–300	301–400	401–500	501–600	Over 600	Total Number Schools
Under 25	1	2	1	1		3	8
26–30	3	5	7	2	5	11	33
31–35	5	9	4	4	3	8	33
36–40	2	4	8	1	2	4	21
41–45		3		1	2	7	13
Over 45	1			3	2	11	17
Total Number	12	23	20	12	14	44	125
Median*	32	34	32	33	35	37	34

*Computed from the original data.

Bookkeeping Room. The numbers of pupil stations provided in the bookkeeping rooms range from 18 to 216 with a median of 36. This median is 2 less than is provided by the typical academic classroom in the same schools. The median area of the bookkeeping rooms is 640 square feet, an average of 16.1 square feet per pupil. It appears that the greatest economy is not being practiced by administrators in this respect. A bookkeeping room might well provide for 40 to 50 students under supervision of a single teacher.

Ample blackboard space is provided since the median area is 185 square feet. Nearly one third of the rooms have no bulletin-board space, while the median area of those so provided is 12 square feet. Forty-two per cent of the rooms have individual tables or desks for students, while 23 per cent have tables which accommodate two students each.

Twenty-three per cent also have special desks for specialized office work. These data are presented in Table III. Tables III to VI inclusive also list another factor which is self-explanatory.

TABLE III. Percentage of High Schools Having Certain Items of Equipment in the Bookkeeping Room and Percentage of Heads of Departments Classifying the Item Essential, Desirable, or Undesirable

Item	Per Cent of Schools: Having Item	Consider Essential	Consider Desirable	Consider Undesirable
Teacher's Desk	100	100	0	0
Business Periodicals	95	100	0	0
Reference Books	92	100	0	0
Bookcase	92	100	0	0
Business Forms	90	100	0	0
Paper Punch	82	95	5	0
Display Boards	82	100	0	0
Display Case	82	100	0	0
Inkwells	82	75	8	17
Storage Cabinet	78	88	12	0
Tables with Drawers	75	59	31	10
Bookkeeping Desks	72	82	10	8
Adding Machine	57	44	47	9
Calculator	36	72	28	0
Keys with Cabinets	35	62	28	10
Accounting Handbook	35	81	19	0
Teacher's File	24	23	64	13
Special Desks	23	23	12	65
Comptometer	21	55	22	23
Bookkeeping Machine	11	22	32	46

The head of the commercial department was asked to check each listed item of equipment as to whether it was considered, (1) essential, (2) desirable but not essential, or (3) undesirable. To illustrate, all department heads consider essential such items as teachers' desk, business periodicals, reference books, bookcase, business forms, display boards or cases. These same items are found in at least 82 per cent of all the schools.

TABLE IV. Percentage of High Schools Having Certain Items of Equipment in the Typewriting Room, and Percentages of Heads of Departments Classifying the Item Essential, Desirable, or Undesirable

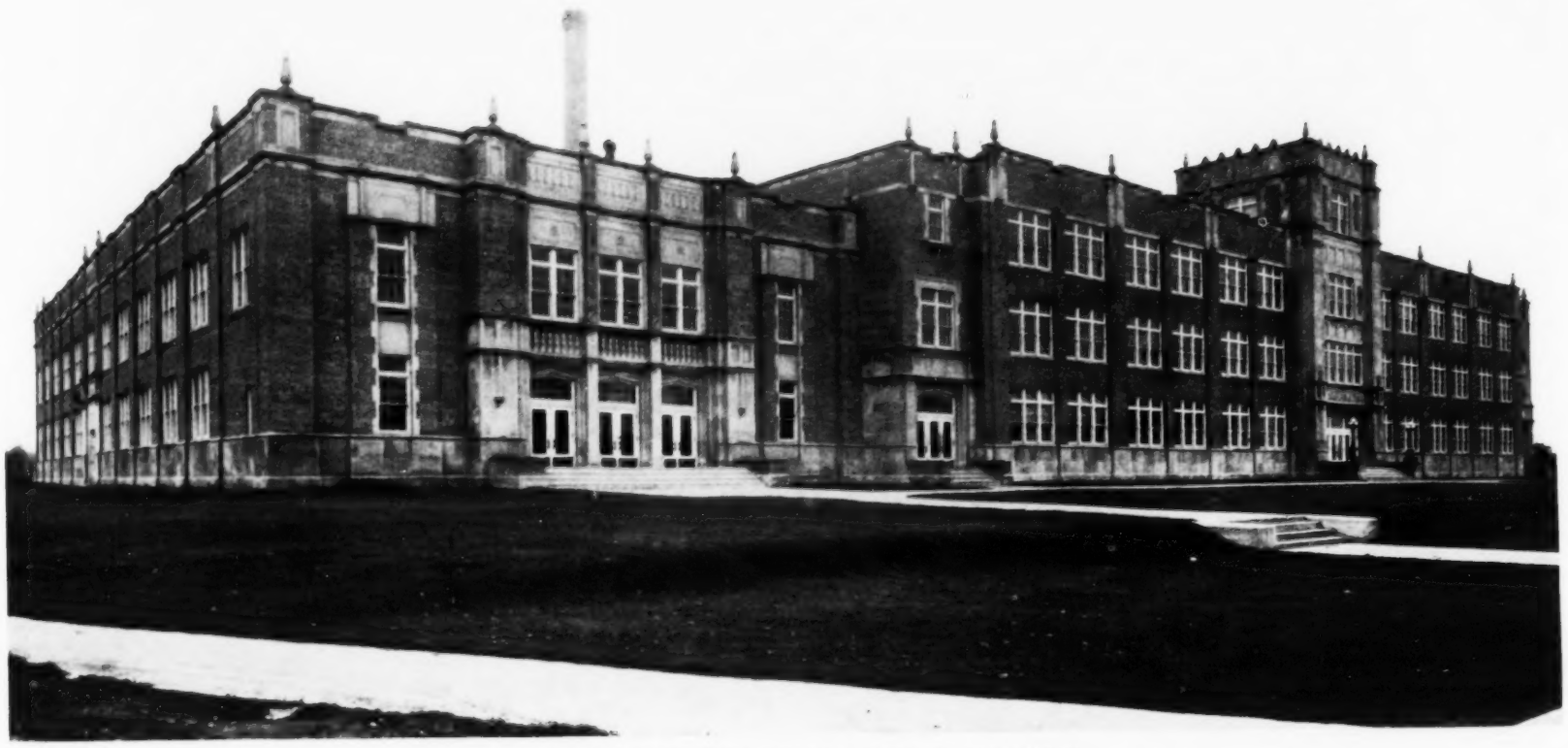
Item	Per Cent of Schools: Having Item	Consider Essential	Consider Desirable	Consider Undesirable
Typewriters	100	100	0	0
Tables for Machines	100	100	0	0
Straight Chairs	100	100	0	0
Keyboard Charts	100	100	0	0
Teacher's Desk	100	100	0	0
Desk Tray	88	62	27	11
Dictionary	88	100	0	0
Reference Books	76	62	38	0
Individual Tables	76	83	7	10
Different Makes Typewriters	72	83	17	0
Diagram Charts	72	63	37	0
Phonograph	72	79	13	8
Rhythm Records	72	79	13	8
Teacher's Filing Cabinets	65	72	18	10
Stop Watch	38	22	54	24
Group Tables	24	10	7	83
Special Desks	23	45	42	13
Desk Bell	17	24	71	5
Display Case	12	39	42	19
Metronome	8	12	78	10

Stenography Room. Eighty-eight per cent of the stenography rooms are reported to be wholly separate rooms. The remaining 12 per cent are separated by office partitions, partially glass. Only 6 per cent of the schools report that they have more than one room devoted to stenography. The median floor area of this room is 725 square feet, with provision for 37 students. Sixty-two per cent provide individual student desks, while 38 per cent have tables. Bulletin boards are reported in 88 per cent, and a bookcase in 71 per cent of the entire group.

Typewriting Room. In every case the typewriting room is located adjacent to the stenography room. This permits a closer coöperation in the work of these two branches. The room is approximately equal in size to that of the academic classroom, since it has a floor area of 690 square feet. The room provides for 42 students at one time. In 86 per cent of these rooms the typewriting tables are individual. In these cases the prevailing size of table is 18 by 32 inches. Table IV shows that the items of typewriters, tables for the machines, straight chairs, keyboard charts, and teacher's desks are found in all of the typewriting rooms. These same items are considered essential by the heads of these departments. These are apparently the important items of equipment in this room. Different makes of typewriters are found in only 72 per cent of the schools, and considered essential by 83 per cent of the department heads. These instructors maintain that typists going out from the school should be familiar with various makes of machines. A practical solution might involve a survey of the typical business institutions of the community. The proportion of typewriters purchased might be about the same as the survey shows in use in the community.

Commercial Laboratory. There may be considerable confusion in the use of the names for the rooms, commercial laboratory and office-practice room. They are taken here to be more or less synonymous. They may at least be assumed to provide for the same type of instruction. This room is found in 29.6 per cent of the schools. Since the need for calculating- and bookkeeping-machine operators has become so great, it seems probable that most of these schools in the near future will make provisions for this type of instruction. Such instruction in-

(Concluded on Page 137)



WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin

THE WASHINGTON PARK AND WILLIAM HORLICK SENIOR HIGH SCHOOLS, RACINE, WISCONSIN

F. M. Longanecker, Superintendent of Schools, Racine, Wisconsin

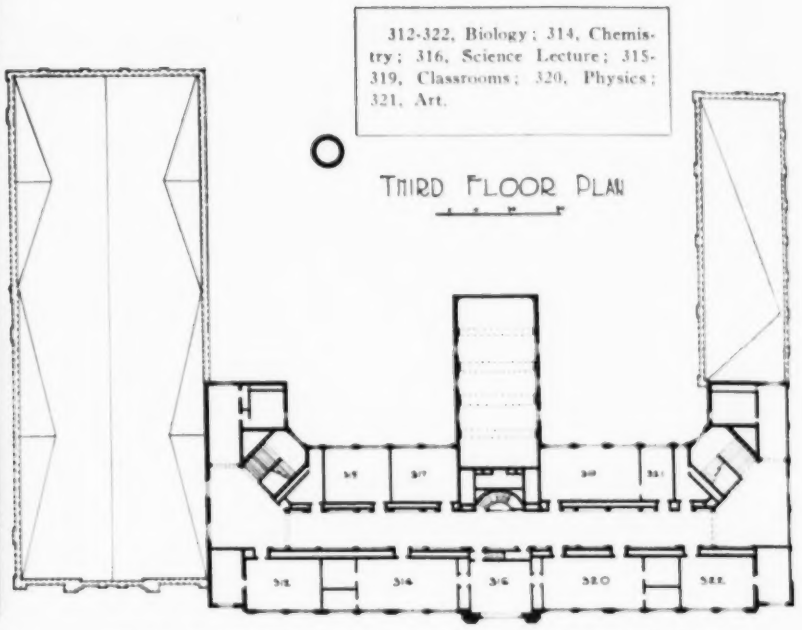
At the close of the world war the public schools of Racine, Wisconsin, were operating under the eight-four plan. Practically all the buildings in the city were badly overcrowded. The city a few years prior to the war, and during the war, had grown very rapidly. Due to war-time restrictions on building operations, the city therefore had not been able to keep pace with the growth of the schools.

In the elementary schools, classes were being held in temporary rooms, in gymnasiums, and in some cases, in what were virtually attic rooms. In several buildings, the children were on part time. The high school was housed in a building erected in the early nineties. High-school classes were conducted in five or six different buildings, quarters which were in most cases wholly unsuited for school purposes.

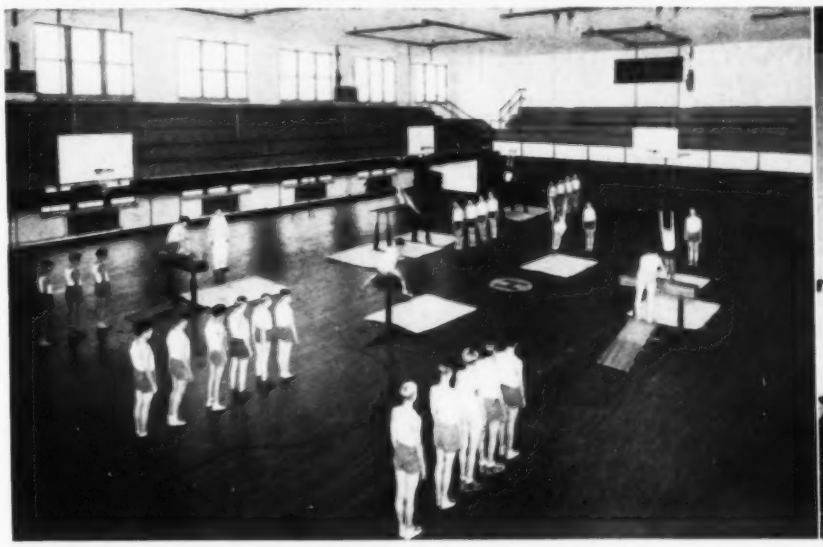
With the close of the world war, the board of education adopted the six-three-three, or junior-high-school plan, and plans were made for the immediate erection of three junior high schools. This furnished relief to the elementary schools by removing the seventh and eighth grades from all the elementary schools. It also furnished relief to the high school by removing the ninth grade. The normal capacity of the three junior high schools was approximately 2,000 to 2,100 pupils. One of these junior high schools was opened in September, 1921; the second in November, 1921; and the third in September, 1922. These three buildings were described in the April, 1923, issue of the SCHOOL BOARD JOURNAL. While this furnished some relief for the high school, it was only temporary, and the situation in the high school again became acute. The relief afforded the elementary schools also was only temporary. In 1924 and 1925 large additions were made to two elementary schools and a new elementary

ENTRANCE DETAILS, WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin

CLASSROOM, WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin



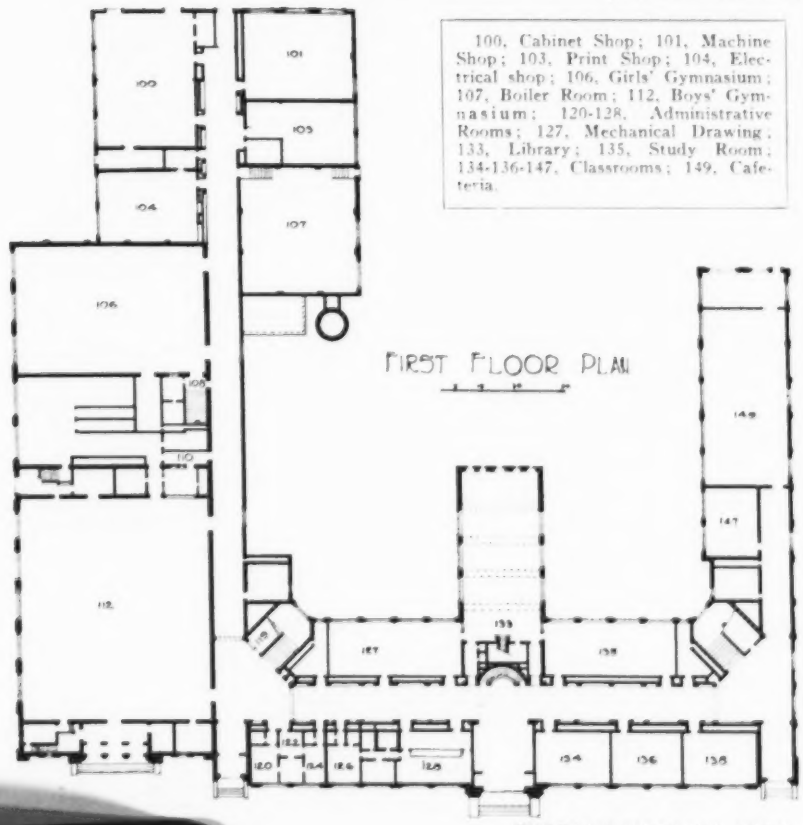
WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN



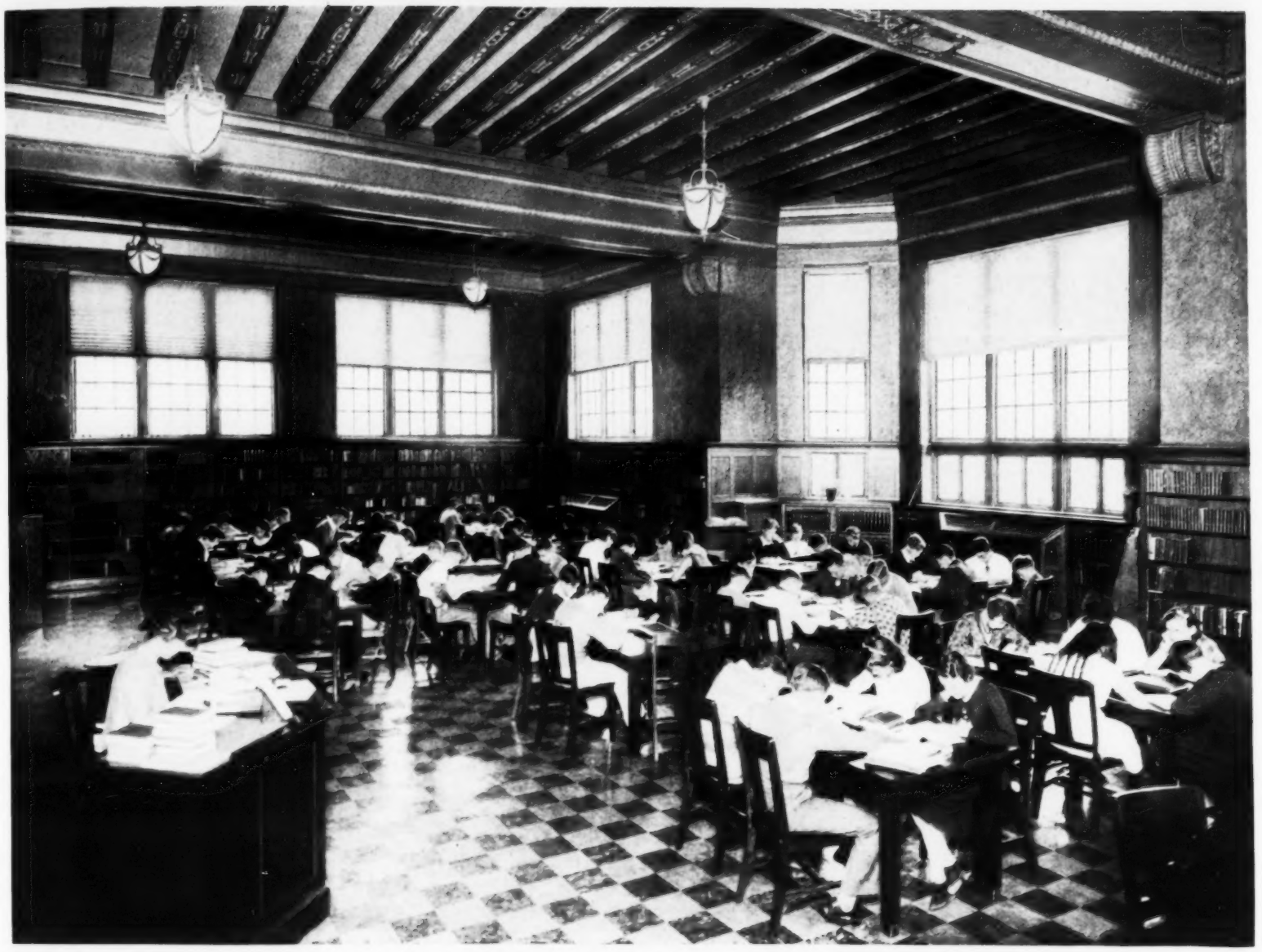
GYMNASIUM

STAGE IN SMALL AUDITORIUM

INTERIOR VIEWS OF THE WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin


100, Cabinet Shop; 101, Machine Shop; 103, Print Shop; 104, Electrical shop; 106, Girls' Gymnasium; 107, Boiler Room; 112, Boys' Gymnasium; 120-128, Administrative Rooms; 127, Mechanical Drawing; 133, Library; 135, Study Room; 134-136-147, Classrooms; 149, Cafeteria.
FIRST FLOOR PLAN
214-220, Commercial Department; 217-219-222-226, Classrooms; 221, Small Auditorium; 237-239, Domestic Science.
SECOND FLOOR PLAN

WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin



LIBRARY, WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota

GYMNASIUM, WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota

school was constructed, all of these projects being carried on simultaneously.

The high-school question, however, remained unsolved. There was considerable debate as to whether the city should provide one or two senior high schools. After mature deliberation, it was decided to provide for two high schools, to be erected simultaneously. Looking forward to the time when new high-school facilities would be needed, the board of education in 1918 had acquired a 14-acre site adjacent to Washington Park. Washington Park is located in the heart of the south side residence section and contains 58 acres, not including the high-school site. In this park there is a considerable section of native timber. There are also a 9-hole municipal golf course and other recreational facilities including a beautiful municipal clubhouse. The park makes a very ideal recreational center and is generously patronized. Fortunately, one corner of the park, 14 acres, was available. This park is located somewhat south of the center of population of the city. Because of its proximity to Washington Park, the school was named the Washington Park High School.

About the same time, Mr. William Horlick presented to the board of education a 12-acre site on the north side of the city. The arrangements for the purchase of the Washington Park site of 14 acres, and the acceptance of the gift from Mr. William Horlick, occurred at the meeting of the board of education held in September, 1918. By resolution, adopted by the board of education at this meeting, it was decided the school to be erected on the Horlick site should be called the William Horlick High School.

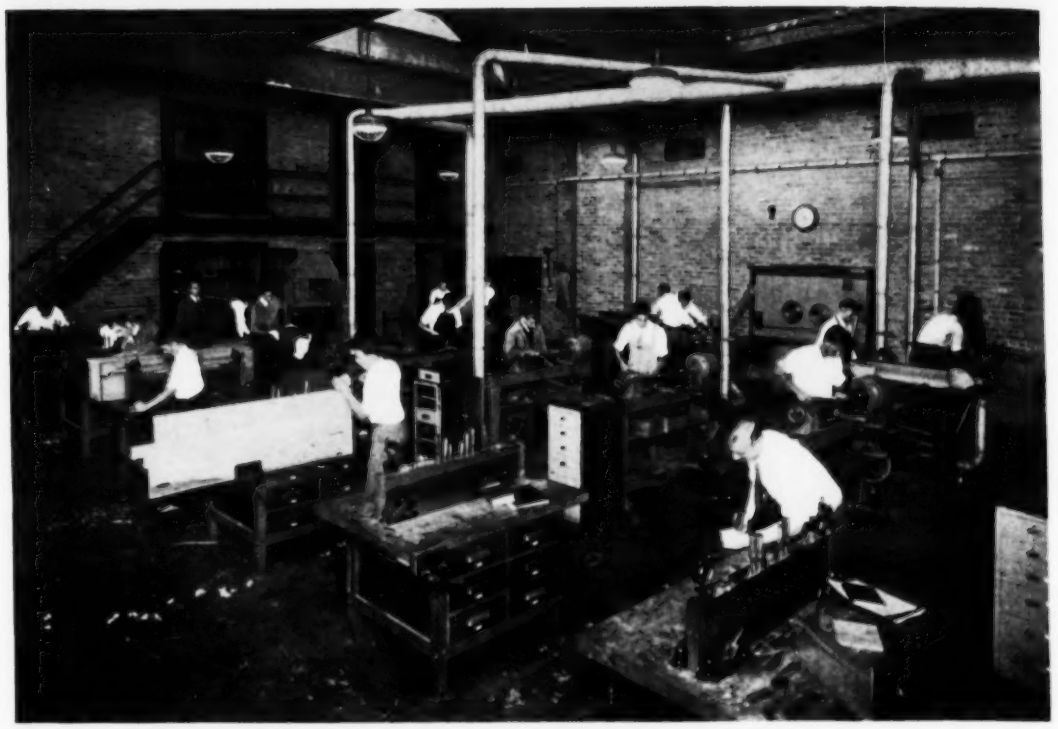
It will be seen, therefore, that in the last decade the city of Racine has accomplished three major objectives in its building program, namely, the building of three junior high schools almost simultaneously, the building of two large additions to two elementary schools, the construction of a new elementary school at about the same time, and more recently the simultaneous construction of two senior high schools. The latter is probably a somewhat unusual procedure for a city the size of Racine, with a population according to the 1930 census of 67,515.

Owing to a somewhat peculiar distribution of population, it was not possible to divide the school district of Racine into two equal parts for high-school purposes, therefore the two buildings are not of equal size, the Washington Park being about 50 per cent larger than the William Horlick.

In 1910, the public-school enrollment of the city was 5,850, in 1920 it had grown to 9,191, and in 1930 it was 13,031. In 1910, the high-school enrollment was 600. This was a four-year high school. In 1920, the high-school enrollment had grown to 1,259 and the school was still a four-year high school. In 1930, the Washington Park High School had an enrollment of 1,220 and the William Horlick 551. The high schools of 1930 were three-year or senior high schools. For the current year (1930–31) the total enrollment of the two senior high schools will be somewhat in excess of 2,000. The ninth grades in the junior high schools have an enrollment of approximately 1,000. In other words, the enrollments in the four years of the public-school course have increased from 600 in 1910, to approximately 3,000 in 1930. The population of the city in 1910 was 38,002, and in 1930 it was 67,515.

In view of this experience during the past twenty years the board of education at the present time has under consideration the purchase of a high-school site for a third prospective high school.

The choice of architects, the preparation of plans, and advertising for bids consumed considerable time. Contracts were let for both buildings in June, 1927, and construction was immediately begun. The William Horlick High



WOODWORKING SHOP

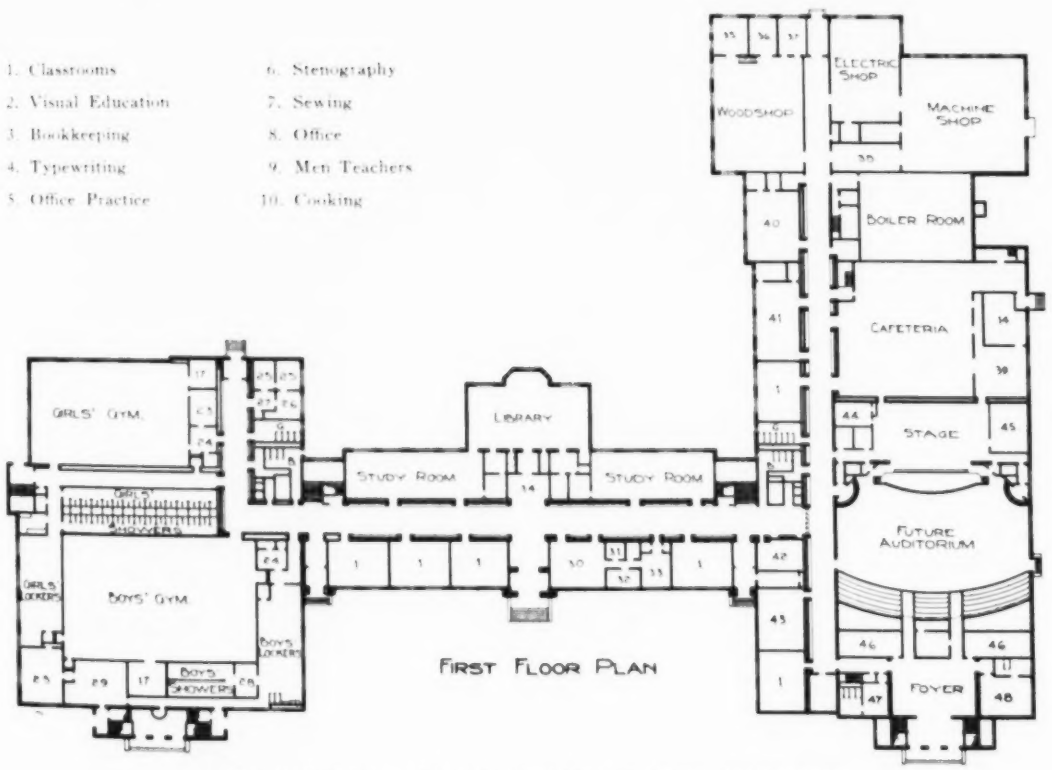
SEWING ROOM

CAFETERIA

INTERIOR VIEWS OF THE WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin

WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota

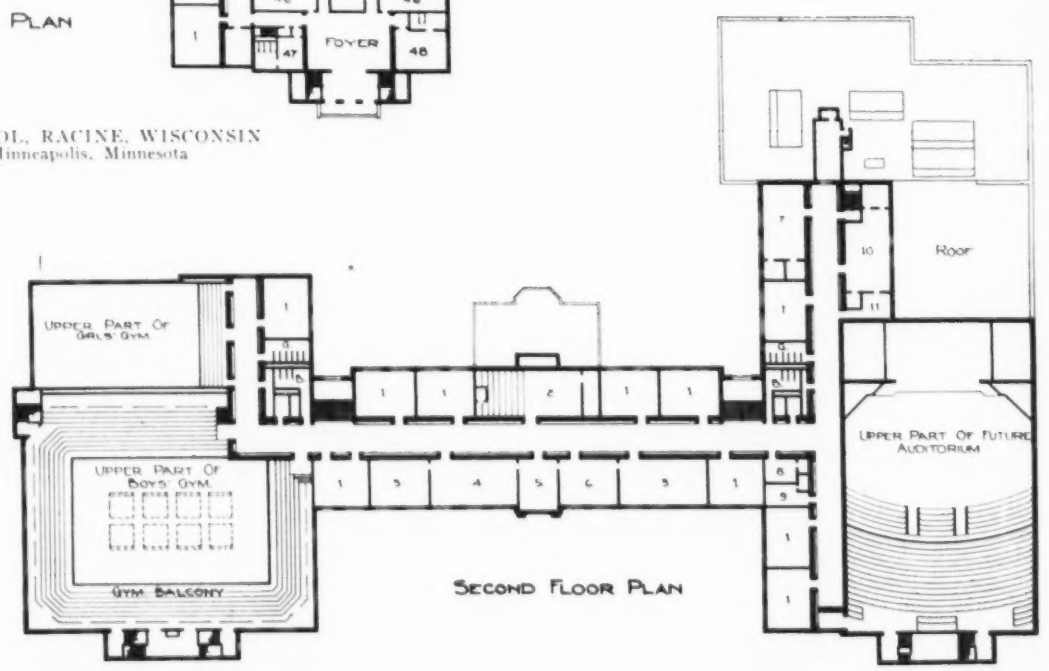
1. Classrooms
2. Visual Education
3. Bookkeeping
4. Typewriting
5. Office Practice
6. Stenography
7. Sewing
8. Office
9. Men Teachers
10. Cooking



29. Home Team
30. General Office
31. Office Work Room
32. Vault
33. Principal
34. Trophies
35. Finishing Room
36. Incomplete Work
37. Lumber
38. Washroom
39. Kitchen
40. Printing
41. Mechanical Drawing
42. Books
43. Public Speaking
44. Dressing Room
45. Scenery Storage
46. Checkrooms
47. Men's Toilet
48. Women's Toilet

WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota

11. Laundry
12. Botany
13. Plant Room
14. Supplies
15. Biology
16. Physics Laboratory
17. Apparatus Room
18. Chemistry Laboratory
19. Chemistry Lecture Room
20. Music Room
21. Art Project Room
22. Art Room
23. Corrective Exercises
24. Instructor
25. Rest Room
26. Nurse
27. Waiting Room
28. Drying Room



WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota

LIBRARY, WILLIAM HORLICK HIGH SCHOOL, RACINE, WISCONSIN
J. Mandor Matson, Architect, Racine, Wisconsin

School was completed and occupied in September, 1928, and the Washington Park High School in January, 1929. The old Racine High School building occupied half a block near the downtown business section. This land was sold to the county, and the remaining half of the block was also acquired by the county, so at the present time an eleven-story courthouse is being erected on that site. Both high-school buildings are located a considerable distance away from the business sections. The Washington Park building is almost at the exact center of the population served by this building. The William Horlick building, however, is nearer the edge of the city to the northwest. Because the business section is to the south and the lake to the east, the future growth naturally will be compelled to move in the direction of the building and in time it, too, will be in the center of its population.

The Washington Park High School

The Washington Park High School has 51 teacher stations distributed as follows:

27 academic classrooms
2 study halls with a joint capacity of about 225
14 special rooms and laboratories as follows: public speaking, visual education, art, music, commercial (4), science (4), and household arts (2).

There are six shops as follows: printing, mechanical drawing, woodworking, electrical construction, machine shop, and patternmaking.

In the physical-education department there are separate gymnasiums for boys and girls, a separate corrective exercise room, teamrooms for the home team and visiting teams, and apparatus-storage rooms. The boys' gymnasium floor is 60 by 96 ft. and the girls' gymnasium 50 by 80 ft., the balcony in the boys' gymnasium has a maximum seating capacity of 2,500. The locker rooms are well lighted and commodious. Shower rooms are located under the visitors' balconies.

The library is 30 by 64 ft. The cafeteria which is 42 by 91 ft., is capable of accommodating 450 at one time. The building, which has a normal capacity of 1,285 pupils, was occupied for the first time on January 3, 1929. Although it has been in use for less than two years, the enrollment for the current year 1930–31, will be somewhat more than 1,400 pupils.

The building was planned on the semidetached-unit plan, the physical-education unit occupying the east end of the building with separate entrances, and the auditorium, still to be erected, to occupy the west end of the building. The middle, or academic section, is three stories in height and houses the academic classes, the science, and commercial departments. The commercial department has a separate suite of rooms on the second floor and the science department has a separate suite on the third floor. The manual-arts shops which are housed in a one-story section on the west side of the building are located in the rear of the auditorium and cafeteria.

Probably the most distinctive feature of the building is the library, which is opposite the main entrance of the building and connected directly with both study halls. Above the library is the visual-education room without any natural light. This room is fully equipped with visual-education apparatus and is capable of seating 175 pupils.

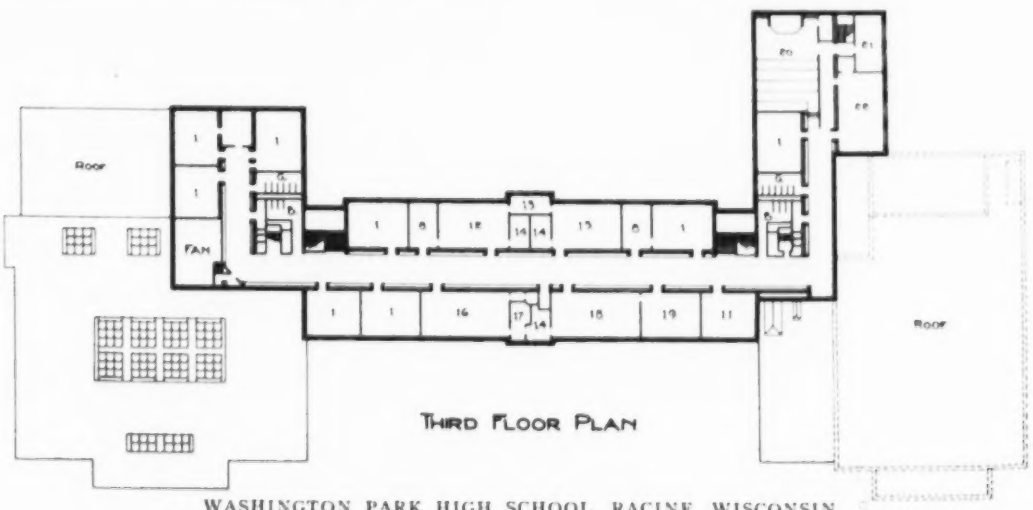
The building may be enlarged by the addition of another wing on the east side. Fortunately, the site is large enough to permit a very large addition if necessary. The corridor floors are terrazzo and the classroom floors in the academic rooms are asbestone. In the library and laboratories, rubber-stone tile has been used. The longest dimension from east to west is 517 ft. and from north to south 254 ft. The total cost of the building was $835,000, and the cost of the equipment was $120,000.

The William Horlick High School

The William Horlick High School has 38 teacher stations distributed as follows:

17 academic classrooms
1 study hall with a capacity of 100
12 special rooms and laboratories as follows: public speaking, art, music, commercial (3), science (4) household arts (2).

(Continued on Page 140)



WASHINGTON PARK HIGH SCHOOL, RACINE, WISCONSIN
Croft and Boerner, Architects, Minneapolis, Minnesota. For Key see Page 61.

MARY GILLESPIE MEMORIAL LIBRARY, DEWEY SCHOOL, EVANSTON, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois
(6-Grade Elementary, Completed in 1924)

This room occupies a corridor end otherwise unused in the school of fifteen years ago. It is a circulating library, as indicated by the charging desk in the lower left corner. A built-in seat in the bay window provides an attractive place for primary pupils, with two slanting top reading desks. Gray oak tables of different shapes with Windsor type chairs, window curtains of casement cloth, ornamental metal bands around standard lighting units, and a few well-chosen pictures provide the charm and library atmosphere.

LIBRARY, WILLIAM H. HATCH SCHOOL, OAK PARK, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois
(8-Grade Elementary, Completed in 1927)

The library, which is 22 by 40 feet in size, is arranged similar to the library of the Mann School in the disposition of the conference rooms and the administrative suite for supervision purposes. The concrete beamed ceiling and the arched opening into the corridor relieve the otherwise hard lines of the room. The bust of Horace Mann on the filing cabinet also adds charm, of which our schoolrooms are sorely in need at the present time.

Planning Libraries for Elementary and Junior High Schools

Frank A. Childs, A. I. A., Chicago, Illinois

Modern educational literature indicates that many schoolmen are aware of the fact that education does not carry over into adult life. One method of encouraging such a carryover is the consistent development, in school, of the reading habit.

Questionnaires sent out to schools by the firm of Childs & Smith, architects, in an effort to base the planning of school reading quarters on the reading activities of the school seem to indicate two well-defined trends:

1. A decentralized organization of reading activities in which books and other literature pertinent to subjects of the curriculum are housed in the centers (rooms or suites of rooms) used by special departments, such as literature, history, science, civics, etc., where the reading is constantly supervised by the teachers, concerned, and

2. A centralized organization of reading materials resulting in a single, well-equipped library, centrally located, open to all departments, carefully organized according to professional library techniques, and in charge of a trained librarian who serves both teachers and pupils in the development of projects, classroom assignments, and free reading.

Before an architect can successfully plan a school, he must know whether a centralized or a decentralized library program is called for. To clarify the problem, let us examine in some detail the physical equipment suggested by the elementary school of Highland Park, Ill., pictures of which are shown.

LIBRARY, HORACE MANN ELEMENTARY SCHOOL, OAK PARK, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois
(8-Grade Elementary, Completed in 1928)

The library is located on the second floor of this three-story school. At one end of the room, one sees the two conference rooms, which are easily supervised through clear glass panel in the doors. At the opposite end of the room is the administration suite, consisting of principal's office, clinic, and teachers' restroom, which provides supervision in the absence of the librarian. The bookshelves are 7 ft. high, the upper shelf being enclosed with wood-panel doors. The room is attractively lighted by standard units embellished with perforated ornamental iron bands.

Here, American history classes carry on in a room equipped in the Colonial style. To more closely associate every phase of the Colonial period in his mind, each student assembles a loose-leaf file of some one hundred or more pages of legal cap size, illustrating the life of those days: the streets, churches, houses, gardens, doorways, interiors, beautiful staircases, fireplaces, chairs, tables, draperies, costumes, etc.

What more logical study of an epoch than this, initiating in the mind of the pupils a love and appreciation of fitting and beautiful things, so utterly lacking in the superficial study of art in most of our schools of today.

GEORGE M. VIAL MEMORIAL LIBRARY, COSSITT AVENUE SCHOOL, LA GRANGE, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois
(8-Grade Elementary, Completed in 1923)

This room has a variety of equipment suited to grades one to eight. Note in upper left-hand corner the reading desk for the primary department with special story book compartments above. Two sizes of tables and chairs accommodate various ages. Book displays, magazine racks, art, and clipping files were all designed and included in the library by the architects. Ornamental torcheres mark the entrance, with a memorial tablet at each side, and bronze clock dial above.

In every phase of the work, books other than texts are demanded and these are found generously displayed in the history suite which is equipped with low shelving and reading tables. The literature suite has also its quota of shelves and tables and its generous supply of books in charge of the literature teacher.

A very different problem for the architect is that presented when a school decides to centralize its reading activities in one large reading room in charge of a trained librarian. Beautiful examples of this kind of development in the elementary school are to be found in the Mt. Auburn School in Cleveland, in a number of schools in Long Beach, California, and in the Lincoln School, New York City.

Here the book resources of the whole school are centralized in a single, large, well-equipped room closely resembling the children's room of the public library. Such classroom collections as exist are sent out from the central library as temporary loans, and every encouragement is given to children to come to the library both for assigned work and for personal reasons.

Between these two well-defined types are some not so well defined. We may illustrate by reports coming from Seattle where the book collection is centralized, but the activities are in charge of a reading teacher who devotes half of each period to conducting classroom activities in reading and literature. Attendance is scheduled by groups and projects outside of reading are not specially emphasized.

It is obvious that for the centralized type, the architect draws largely on the children's department of the public library for his ideas. But to the children's reading room of the public library, he adds the school conference rooms and a librarian's workroom.

In the junior high school the well-equipped centralized library is more often found than in the elementary school. Here architecture follows rather closely the best plans evolved for high-school libraries.[1] Standards for such libra-

[1]See such publications as Fargo, *The Library and the School*.

ries were set up some years ago by the American Library Association and the National Education Association.[2]

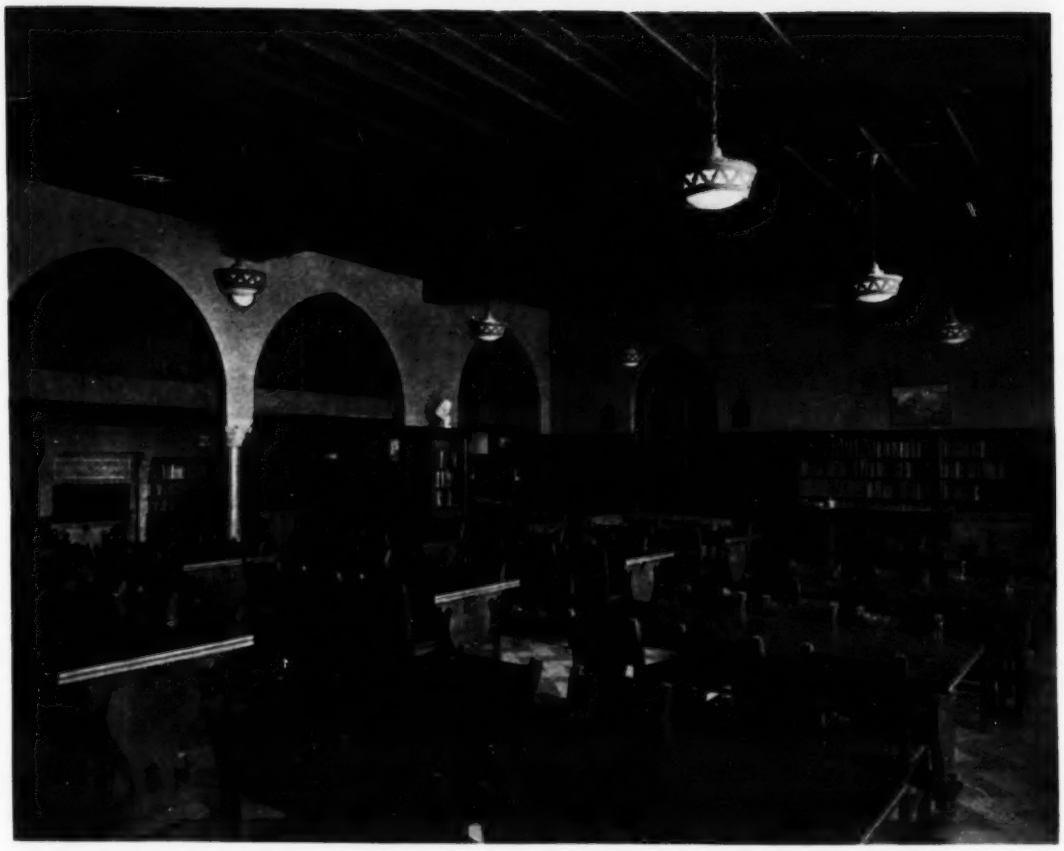
Such items as the amount of floor space per reader, heights of shelving, chairs, and tables for various types of libraries, and dimensions of files, are all carefully treated in publications such as those previously mentioned.

It is the work of the architect to adapt them to local situations, so to locate the room that it will be accessible to all parts of the building, to design it so that its activities may be easily supervised by a limited staff, and to see that it is so placed that it may easily be expanded to meet the needs of future growth. Finally, all requirements of plan, equipment, and detail should be so treated by the architect to insure an attractive and dignified interior.

The location of the library in the school plan should always be a central one, communicating with study halls if this fast-disappearing feature of our modern school is demanded. The rapidly increasing use of the school at night by the community is already dictating its location on the entrance floor grouped with other features possible of use by the general public. As to size, it should accommodate at least 10 per cent of the school enrollment, and more, if possible. It should permit of expansion and should not be placed between fixed features, such as stairs or toilets. While a 12-ft. ceiling is adequate for elementary buildings, a 15-ft. ceiling is desirable for junior and senior high schools, which allows of high windows with 7-ft. shelving below.

In the interest of orderliness and ease of maintenance, shelving and as much other equipment recessed and built into the walls is a great asset. From the standpoint of flexibility, some educators object to this method and prefer unit

[2] Certain, *Standard Library Organization and Equipment.*

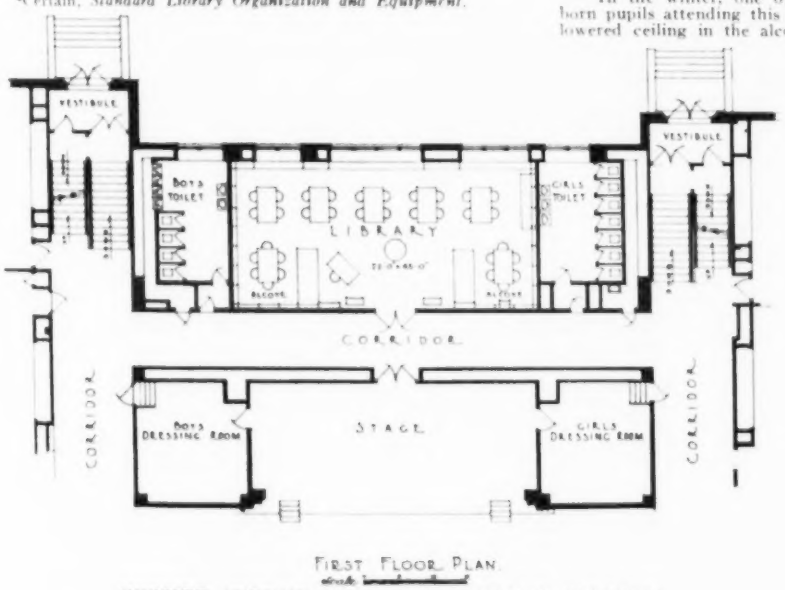


MAIN READING ROOM, NICHOLS INTERMEDIATE SCHOOL, EVANSTON, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois (7-8 Grades, Completed in 1929)

Illustration shows the fireplace nook and the mezzanine balcony over which is screened a wrought-iron grille. The ceiling is of concrete, stained a warm Italian brown. The lighting fixtures are the standard classroom unit, ornamented with a perforated metal band. The floor is covered with linoleum in a modern zigzag pattern, and the chairs and tables are specially designed.

The library, which immediately adjoins the main entrance of the building, is so treated with ornamental iron gates, that it can be closed off from the school proper on the main floor and from the auditorium on the second floor. With this provision it can be used at night as a branch of the Evanston Public Library. Off the library is a large conference room (Tudor Hall), with stage and mezzanine, which is used in conjunction with the library, also by the English department for the rehearsal of their Shakespearean productions. In view of this special outside entrance, the conference room is available for use at night by small groups and for community meetings. A librarian's workroom completes the department.

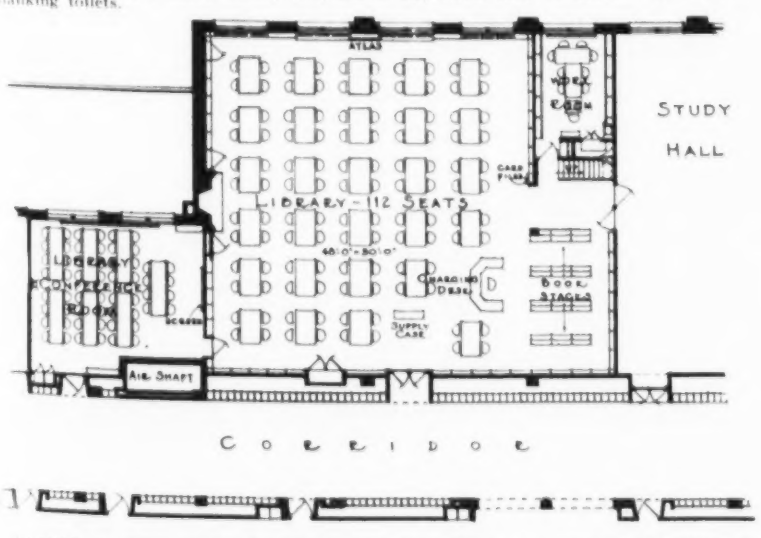
In the winter, one often finds a fire burning in the fireplace, which has proved a great attraction to the foreign-born pupils attending this school who have nothing like it in their homes. It also lends charm and distinction, and the lowered ceiling in the alcove, with the mezzanine storage loft above, adds to the informality of the room.



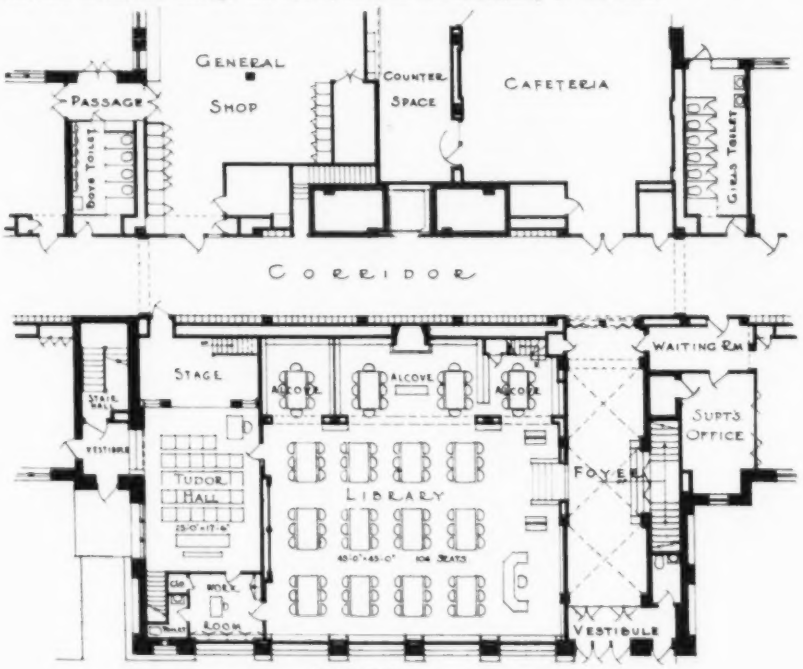
FIRST FLOOR PLAN

COSSITT AVENUE SCHOOL, LA GRANGE, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois

This library was planned about eight years ago, before the scope of the library in the elementary school was realized. It is very evident that the increase in facilities to accommodate the modern library program is impossible here on account of the two flanking toilets.



SECOND FLOOR PLAN, JACKSON HIGH SCHOOL, JACKSON, MICHIGAN
Childs and Smith, Architects, Chicago, Illinois



FIRST FLOOR PLAN, NICHOLS INTERMEDIATE SCHOOL, EVANSTON, ILLINOIS

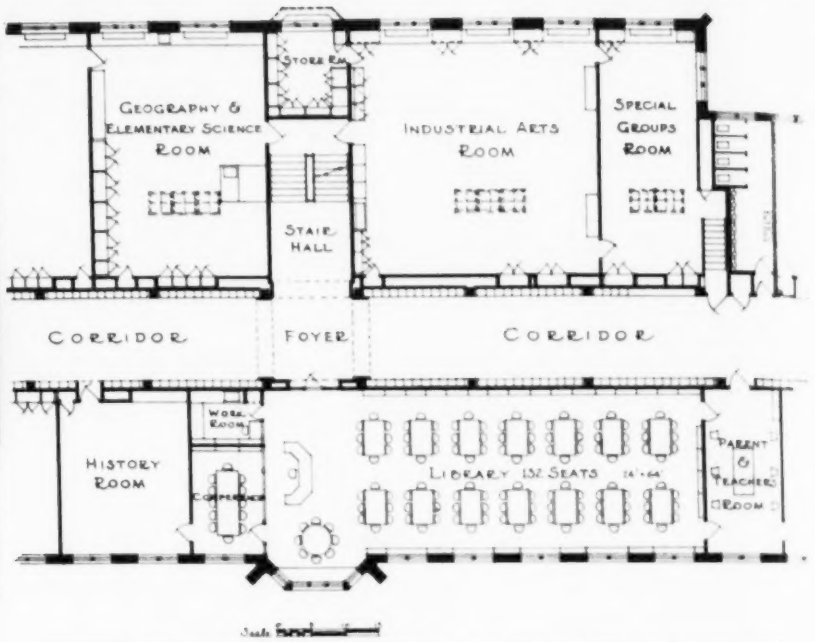
SECOND FLOOR PLAN

HORACE MANN SCHOOL, OAK PARK, ILLINOIS
Childs and Smith, Architects, Chicago, Illinois

LITERATURE ROOM, ELM STREET SCHOOL, HIGHLAND PARK, ILLINOIS
(8-Grade Elementary)

The above illustration is the homeroom for one group, and three other groups occupy it one period each day. The view is toward the front of the room. There are four round tables in the room, each accommodating, with book shelving under its top, eight pupils. The two rectangular tables display books of history and travel especially to supplement the work in the history and geography rooms. The "returns" from this device have been very appreciable. Books scattered over the tables are to attract attention to their contents.

The "winter bouquets" represent the product of the school garden, forage grasses, etc., such as, in the picture, feterita, sudan grass, broom corn.



FUTURE DEVELOPMENT OF LIBRARY, LONGFELLOW ELEMENTARY SCHOOL, PONTIAC, MICHIGAN
Childs and Smith, Architects, Chicago, Illinois

cases purchased from equipment companies from time to time as requirements and policies change.

In the centralized organization, the librarian's workroom needs inclosed shelving under lock and key for some five hundred volumes; a supply cupboard and work counter. The room should be equipped with sink, hot and cold water, and electric power or gas outlets for various purposes. A coat-closet unit and an ordinary worktable, with two or more chairs for assistants, complete the furniture for this space.

Racks for displaying twenty or thirty magazines, with space below for storage of three or more back numbers, are desirable. Adequate filing cases for magazine articles, clippings, illustrations, historical, art and scientific subjects, are a rapidly increasing requirement of the modern school. At least one conference room and more, if possible, for study, discussion, and project work of special groups, under general supervision from the main desk, is highly desirable.

The library plans submitted with this paper are actual examples, some planned six or eight years ago before library requirements and policies were less clearly formulated. Two or more diagrams show the impossibility of extension and the necessity of a change in location, if this educational feature is to be developed along modern lines. Other diagrams show future development of actual present plans to provide increased library facilities.

Suggestive steps to be followed to insure adequate library plans:

1. Study, discussion, and selection of service desired — centralized or decentralized.

2. Complete outline of requirements in detail, submitted in writing to the architect, signed by the superintendent, principal, librarian, and school-library supervisor.

a) Shelving capacity — present and future.

b) Seating capacity — present and future.

c) Number of rooms subsidiary to main reading room (ie., conference, workroom, and lecture rooms).

d) Relation to other rooms in building and use by public after school hours.

e) Complete list of all equipment items, such as card index and clipping files, bulletin boards, special display cabinets, magazine racks, and storage space.

For a decentralized library development, the specifications should include: number of volumes to be shelved in various classrooms, nature of equipment, etc.

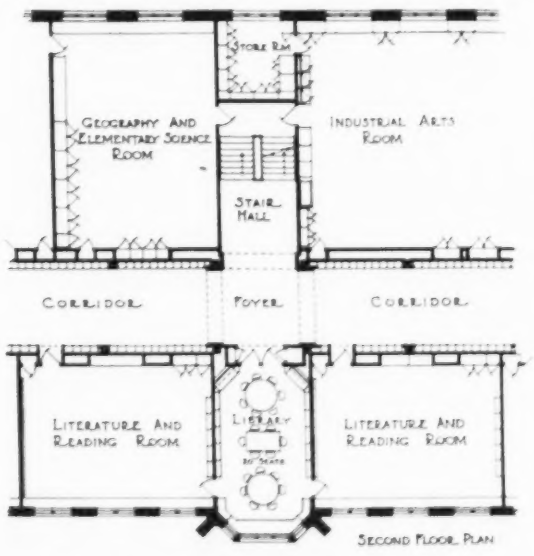
3. Preparation of ¼-in.-scale plans, blue prints and descriptive text by the architects, embodying items given above.

4. Criticism of the tentative plans by the principal and librarian, and others concerned, made in writing.

5. Revision of the plans by the architect.

6. The architect does not proceed with the working drawings until these preliminary plans, wall elevations, case details, descriptive texts, etc., have been approved, in writing, by the faculty.

7. It is customary for these outlines to be supplied in duplicate; the owner to be provided with one copy for his files and final check of the completed work.



LONGFELLOW ELEMENTARY SCHOOL, PONTIAC, MICHIGAN
Childs and Smith, Architects, Chicago, Illinois
(Completed in 1929)

The library, which is centrally located on the second floor, at the head of the main stairs, is well placed from the standpoint of those entering the building for the first time. It is between the two literature and reading rooms and at some future time will be enlarged, no doubt, as indicated in the accompanying plan showing future development, which will provide a library adequate for an ultimate enrollment of from 1,500 to 2,000 students, with one conference room, parent-teachers' room, and librarian's room.

Planning Science Laboratories for High Schools

A. C. Monahan, Formerly U. S. Bureau of Education

Science in the smaller high school presents problems peculiar to these schools, which are not, however, insurmountable. Fear of inability to overcome them has often curtailed the complete courses that should be given. It is unnecessary. These problems usually concern the space necessary for laboratory rooms, the purchase of apparatus and equipment for demonstrations and student experiments, and the employment of a trained teacher. All can be met without undue outlay, if a sensible plan is followed.

Before discussing the specific science-teaching problems, a statement relative to the place of science in the high school is in order. According to a recent study by the U. S. Bureau of Education, approximately 53 per cent of all high-school students are enrolled in one or more classes in science. The courses most common today are biology, physics, and chemistry. General science, agriculture, and hygiene and sanitation are next common. Astronomy, geology, physical geography, zoölogy, botany, and physiology, subjects common a generation ago, have almost disappeared. Of course, some of the subject matter of physical geography is contained in the better courses in general science, and much of botany and zoölogy are included in biology. In fact, it seems safe to say that four subjects now dominate, and that the majority of high schools with four years of sciences are now giving general science in the first year, biology in the second, and physics and chemistry in either order in the third and fourth. Hygiene and sanitation, agriculture and domestic science often replace the general science or biology, but perhaps more often parallel them as special subjects for those interested in them both as pure sciences and for practical purposes.

This, it is worthy of note, is in keeping with the recommendation of the Commission on the Reorganization of Secondary Education in its report on the reorganization of science courses[1] published by the U. S. Office of Education.

Number of Laboratories Needed

Very few high schools need more than a single laboratory for each of the four principal high-

[1] *Reorganization of Science in Secondary Schools*, Bulletin 1920 No. 26, U. S. Office of Education.

(Continued on Page 138)

Public-Works Regulations, Policies, and Practices as Applied to School Buildings

Herbert B. Briggs, Architect, Cleveland, Ohio

Systematized courses of study, trained teachers, four-year courses with graduation, public demand for greater educational advantages, and good roads, are bringing the rural centralized brick, architect-designed, contractor-built school building, with its well-lighted classrooms, combined auditorium and gymnasium, and modern heat, ventilation and sanitation systems, are rapidly coming to replace the contractor-designed-and-built, one-room, wooden, stove-heated, cold-floor, window-ventilated, water-pail-and-tin-dipper, outside-toilet rural-district-school building in which haphazard instruction was given in the "three R's" by (usually) a different teacher during a term of from four to six months each year.

The efficiently planned, fireproof, well-lighted city-school building of today, with its heat, ventilation, and sanitation equipment is supplanting the poorly planned and lighted, antiquated, ineffectively heated, ventilated, and sanitarially equipped, gloomy, atrociously designed city-school building of yesterday.

A Great Period of Construction

Former President Calvin Coolidge tersely pictured our stupendous educational problem in these words in the Cleveland *Plain Dealer* of September 1, 1930: "Another school year is opening. Over 27,000,000 scholars will be enrolled. To this great throng will be added more than 800,000 college students. The teaching force reaches toward a million. Education is a great business enterprise requiring an expenditure of well over $2,000,000,000 each year."

Compulsory school attendance; increase in school-age population; introduction of night, technical, and trade instruction; increase in physical culture and recreational work; expansion of kindergarten work; and countless other improvements in school curricula; inadequate or obsolete buildings; building-code regulations in the interest of safe and sanitary construction; and many other contributing factors have made the past three decades the greatest period of school-building construction in the history of our country. During this time millions of dollars in authorized school-building bonds have been expended in the erection and equipment of school buildings.

In the execution of this work boards of education, educators, school administrators, architects, and engineers have been constantly confronted with countless and everchanging problems of plan, design, construction, safety, lighting, heating, ventilating, electrical equipment, power, sanitation, cost, economy, and other intricate matters. The very large measures of success with which these problems have been met are exemplified in the many efficiently planned, harmoniously designed, substantially constructed, and fittingly equipped modern school buildings as of the year 1931.

Purpose of Paper

For the purpose of citing and discussing some of the factors that have helped or hindered the school-building work of this period and of utilizing the lessons learned in the best interests of future work, the writer, at the request of the Editor, presents the following paper on the application of public-works regulations, policies, and practices to school-building construction, outlined under the following headings: (*a*) boards of education, herein designated school boards; (*b*) public-works procedure laws and building codes; (*c*) bond issues; and (*d*) politics-favoritism.

Future papers will cover: (*a*) architects, their duties and compensation; (*b*) advice to school boards on the selection and employment of architects; (*c*) preliminary sketches; (*d*) working drawings; (*e*) specifications; (*f*) bonds; (*g*) proposal forms; (*h*) advertisements; (*i*) contractors; (*j*) bids; (*k*) awards and contracts; (*l*) supervision of construction; (*m*) payments (estimates) to contractors.

School Boards

As boards of directors, with educators and school administrators as executive officers, school boards are responsible to the public for the inauguration and administration of the educational, building, and business policies of our "great business enterprise" — the public-school systems.

The evolution of the educational, building, and business problems of our present school system has materially increased the duties and has brought into existence, the modern rural and urban school boards consisting of men and women members of education and culture, community standing, ideals and vision, understanding of pedagogical and educational problems and methods, business ability and integrity, and experience in and knowledge of building-construction problems, practice, procedure and costs. These modern boards are replacing the rural-district and urban, politically controlled school boards of the nineteeth century.

While the number of such modern school boards is constantly increasing, there are too many boards of the old kind, whose members place political expediency and self-interest above the public interest. As the education of our children is a paramount function of government, it behooves electorates to vote such incompetent board members out of office and vigilantly keep them out.

Many school boards and educators, well qualified to administer the education part of their duties, have little or no knowledge of building-construction problems, practice, procedure, and costs. Too often such school authorities do not seek or secure competent advice concerning these matters before going forward with building operations. In consequence, they become the prey of unprincipled architects, engineers, manufacturers, contractors, and other self-interested persons, whose promises and representations cause untold financial troubles, expensive or cheap (not inexpensive) construction, and, not infrequently, badly planned and designed buildings.

To such boards and to other boards who sincerely seek help in building-construction practice and procedure this paper is addressed.

Public-Works Procedure Laws and Building Codes

The attention of school boards and their legal advisers, educators, architects, and engineers is called to the questions raised in the following discussion of public-works procedure regulations and building codes; competitive bidding; the effect of regulation and requirement on construction costs; limitations imposed by such regulation and requirement in the use of construction methods and materials; uniformity or lack of it, in application of procedure and building laws; advertisements and bidding; the selection of contractors; inane and expensive red-tape provisions; and other unnecessary, or unduly restrictive, regulations and requirements. This to the end that school officials, architects, and engineers shall be fully conversant with the laws under which they must operate; school officials should not assume, if such laws are too restrictive, that they must be continued in force and effect; but should take such action as may be deemed wise to amend or to annul these laws.

The public-works procedure and building-code laws, past and present, of Ohio — the ones with which the writer is most conversant — are cited as examples of good and bad legislation and as a basis for comment and discussion.

Procedure Laws

State laws, general in application to the state and, with some few exceptions, to its political subdivisions, prescribe the procedure that shall be followed in the performance of all public-works projects.

Ohio's original procedure laws were enacted many years ago to regulate the public-works operations of those days. When new public-works projects came, inadequate or ambiguous amendments to the old laws were made or new laws were enacted. As a result, Ohio's present laws are not uniform in their application to many state and local public-works operations, now separately administered by three different state departments and five different political subdivisions — eight different government functions in all.

These laws contain the proper essentials for procedure, but are in many ways inconsistent, ambiguous, archaic, unfair to the public and bidders, and impose unnecessary and expensive red-tape conditions. Of these procedure provisions the following are particularly cited: bidding and contract instruments for state-institution works must be officially approved by, and officially filed in, three state departments before advertisements for bids are published. Similar approvals and filings are not required for similar public-works instruments of political subdivisions. Detailed bills of materials and estimates of costs are required for all state-institution works — similar requirements do not apply to political subdivision works. No contracts can be awarded on state-institution works if the lowest construction bids exceed the architect's estimates of cost — political-subdivision works are not subject to the same requirements. Separately itemized bids for materials and for labor are required for school-building works — lump sum, or unit price on certain kinds of work, bids only are required for state and other political subdivision works. One hundred per cent combined bid and contract bonds are required on state institution works — 10 per cent or more bid bonds or certified checks with 50 per cent or more contract bonds only are required on other state and on political subdivision works. *No contracts can be awarded for state-institutions unless and until such contracts provide for wholly completed buildings or improvements wholly ready for occupancy — political subdivisions may (and do to the sorrow of the taxpayer) award contracts for the partial completion of similar buildings or improvements.* Phraseology requirements for notices to bidders and number of times such advertisements shall be printed are not uniform for state and political subdivision works. Some public-works contracts must be awarded to the lowest responsible (determined by the bidder's ability to furnish a bond), while on other works contracts may be awarded to the lowest and best (with no provision for the determination of the "best") bidder. Finally, good, bad, and indifferent architects, and contractors are equal before the law.

Are Other State Laws Similar?

If the public-works procedure laws of other states are similar to those of Ohio, it behooves those states — and Ohio, too, — so to revise and codify such laws as to make them unequivocally provide for logical, understandable, free from ambiguity, and uniform-in-application rules for

public-works procedure. They should compel fair, open, full, enforceable competition in the interest of the public, of the contractor, the manufacturer, the dealer. They should insist on ability, integrity, and experience qualifications for the architect, the engineer, the contractor. Finally, they should contain such protective provisions as may be reasonably necessary to safeguard the public against official mismanagement and misuse of public funds, favoritism, graft, fraud, and the construction of cheap and inferior buildings and improvements.

Such laws must reasonably protect the rights and interests of the public, but they should impose no red tape or other expensive conditions beyond those actually required for the accomplishment of these ends.

Building Codes

Neither public nor private building or improvement works were regulated by state or municipal building codes until a few decades ago. The first building codes came through ordinances passed as revenue measures or to provide jobs for the "faithful" rather than for the protection of the public. As urban population increased, fire hazards and housing congestion, fire-insurance companies, job hunters, architects, engineers and others, good and bad, were led to work for and put through further municipal code regulations. Such regulations were largely mild in requirement and were indifferently enforced.

Disasters and holocausts are the channels through which the public is shocked into the realization of dangerous and improper conditions and into taking remedial action to correct conditions which menace life.

The Iroquois theater fire in 1903, and the Collinwood school holocaust in 1908, were outstanding tragedies of this century which brought their terrible fire-menace and lack-of-fire-protection lessons to a horrified public and caused the enactment of municipal and state building-code legislation of varying degrees of value and effectiveness.

In 1911 Ohio enacted a building code to regulate the construction of "School and Assembly Buildings, Theaters, and Sanitation" for all kinds of buildings which, in detailed, technical, specificationlike provisions, required that certain construction methods, materials, devices, and equipment — then in general use in the better classes of construction — be used in the erection of all buildings within its jurisdiction. The administration of the code was, and is, vested in the Division of Factory and Building Inspection of the Industrial Commission — now the Department of Industrial Relations — and, by later amendment, in municipalities maintaining departments of building inspection.

Requirements Found Excessive

While the provisions of the code were perhaps necessary at the time to make buildings safe and sanitary as places of educational instruction and for assembly purposes, it was soon found that the law imposed requirements far beyond those necessary to properly protect and safeguard the public. The code set up maximum, not safe minimum requirements.

Notwithstanding constant change and advancement in building-construction methods and materials since the adoption of the code, the approval of such methods and materials by the best architects and engineers, the general use of them in buildings not so regulated, and the ever-increasing demands for relief, especially in school-building work, from constantly increasing building-construction costs, the mandatory provisions of the code have stood as inflexible barriers to construction progress and cost economies. The Ohio code was neither amended nor added to in any material way from 1911 to 1923. Amendments introduced in three intervening sessions of the legislature were voted down or pigeonholed largely at the behest of manufacturing and other interests. One case will suffice to show the methods employed: The writer introduced an amendment in the House of Representatives in 1915 to modify some of the requirements of the state plumbing code which increased costs. It was passed, then reconsidered, and voted down by rural members. Plumbing-goods interests had quietly circulated the story that farmers would be required to equip their barns with plumbing piping and fixtures if the amendment became a law — a story that had no foundation in fact.

The Building Standards Act

After twelve years' experience with the handicapping provisions of the code and with efforts to change them, the Ohio State Association of Architects declared that the writing of detailed, inflexible, mandatory provisions into inexorable law to regulate building construction in which there is constant change and advancement, is fundamentally wrong. They asked, therefore, that the code be made flexible in its application, and initiated a movement which resulted in the enactment, in 1923, of the Ohio Board of Building Standards Act.

This act created a board in the Department of Industrial Relations which functions in appeal, advisory, and code-writing capacities. It has no administrative or executive powers, and consists of seven members, one of whom is the chief of the division of factory and building inspection in the above department, one the chief engineer of the department of health, and five citizen members. All are appointed by the governor, and are conversant with building-construction practice, procedure, and law.

The fundamentals of the act are that buildings under the code shall be safe and sanitary for use and occupancy; code provisions shall be minimum requirements to make buildings safe and sanitary; and code requirements shall be kept abreast with progress in the building arts.

The board is empowered to hold public hearings on petitions asking for the substitution of construction requirements, methods, materials, devices, or equipment for those required by the 1911 code or by revisions of it, and to determine that such substitutions are, or are not, equivalent in terms of required safety and sanitation to the present provisions of the code. Affirmative action by the board on a substitution petition, when certified to the director of the Department of Industrial Relations and official approval by him, gives such action the force and effect of law. This provision of the act has been upheld by the supreme court of Ohio.

The Board is Effective

The effectiveness of the equivalents provision was demonstrated by the board soon after its organization in deciding that the unit system of heating and ventilation for school buildings was the equivalent of the prescribed central-fan heating and ventilation system of the 1911 code. This action was opposed by interests which had had a part in writing the central-fan-system provisions in the original code. The board thus played a part in the recent changes that have come in school heating and ventilation practice.

In its semiofficial capacity as adviser to the Division of Factory and Building Inspection, in matters of code interpretation and other routine problems, the board keeps in close touch with code workings and construction movements.

The board has rewritten the 1911 code. It has prepared regulations governing the construction of buildings other than schools, assembly halls, and theaters, and has submitted the same to the legislature.

The workability and efficiency of the act creating the board has been fully demonstrated by the board through (*a*) its determination of equivalents actions, (*b*) revision of and additions to the 1911 code; (*c*) establishment of the principle that building regulations need not require more than is necessary to make buildings safe and sanitary (*d*) advisory service; (*e*) and establishment of a coöperative arrangement with the Ohio State University in the investigation and testing of construction methods, materials, devices, and equipment.

Among the tangible results of the board of building-standards work has been the material reduction in required cubic-content sizes for school buildings. These reductions and other provisions have made substantial savings in construction costs possible. School boards, architects, and engineers have not taken the fullest advantage of these cost savings.

Bond Issues

The general interests of the public and the particular interests of bond holders are protected by laws governing the issuance of bonds to finance public-works projects. These laws limit the amounts of bonds which the States and their political subdivisions may issue, but inasfar as the writer knows, they do not unequivocally require boards and commissions to publicly and authentically certify the need for, describe, and estimate the total cost (land, construction, equipment) of public-works projects before the electorate is asked to vote on the bonds. Nor do such laws effectively limit the completion costs of such projects to the amounts of the bonds authorized by the votes of electorates.

If school boards were required to submit such data on needs and costs prior to bond elections and were required to complete building projects at costs not to exceed the amounts of the bonds, the public would not be called upon, as it too often is, to vote more bonds or to meet unexpected obligations to complete school buildings started by inexperienced, ignorant, timid, careless, or dishonest boards. In the absence of such legal requirements the public should not vote a bond issue unless the board has secured, analyzed, and publicly submitted such data, and if the work is proceeded with, the public should make it its business to see that no obligations in excess of the authorized funds are incurred.

The following cases illustrate the results of proceeding without accurate studies of needs, sites, equipment, property improvement, and cost data.

Some Cases Cited

In 1920, a rural school board asked for and was voted a $40,000 bond issue, with which to construct and equip a centralized school. It used for its building the general plan and construction of a centralized school building, erected in a township near by in 1913–14, at a cost of $40,000. In asking for the bonds and in deciding on the type of building, this board neglected to consider these facts: (*a*) the large increase in construction costs between 1913–14 and 1920; (*b*) the cost of a sewage-disposal plant; (*c*) the improvement of the property; (*d*) the cost of the equipment. The cost of the new building was nearly $75,000. This board was honest, but careless.

A city electorate voted more than one-half million dollars to erect and equip two grade buildings and a large addition to a high school. In the bond campaign a natatorium to be placed in the latter building was promised by the school board. The grade buildings were completed, and put into use before bids for the high-school addition were taken. When these bids were received, the board omitted the swimming pool and equipment, the time clocks, and the lighting fixtures, from the contracts because the balance in the bond issue was insufficient to pay for the equipment. This board failed in its campaign promise and was incompetent in the handling of the bond money.

The trustees of a normal school located a teacher-training building on filled-in, swampy ground, and paid an extra of $18,000 to obtain a stable foundation because test borings to determine the nature of the earth under the building were not made.

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Good Illumination in the Schoolroom

Robert L. Zahour, E. E., Pittsburgh, Pa.

During childhood and adolescence, a time when conservation of our physiological resources is farthest from our thoughts, nature is molding the human organs and habits to maturity. One of the most important of these is the eyes, and the habits of vision. Our "seeing system" must be treated with care. Good artificial illumination, supplementing natural illumination when needed during the day and providing the only lighting at night, is a requisite in the prevention of eyestrain and consequent eye fatigue at school where children use their eyes continuously in reading, writing, and other learning activities. Nearsightedness and weak eyes in adults often result from some injury afflicted during careless childhood days, and eye fatigue may be the hidden cause of backwardness in many pupils.

Classroom Illumination

Good illumination that will permit easy vision in the classroom must be of an intensity approaching 10 foot candles. If the lighting falls considerably below this level, students must squint over their work, resulting in eyestrain. This intensity can be obtained by equipping the schoolroom with a squat-type inclosing globe lighting fixtures burning 200-watt Mazda lamps. They should be suspended 9 feet 6 inches above the floor in rooms with a ceiling height of 12 feet, and should be spaced on 10- to 12-foot centers.

Inclosing globes are recommended because they have a low surface brightness, a factor which reduces glare in the schoolroom. The globes are made of opaque glass which diffuses the light and makes for an even distribution throughout the room. Lighting units should never be suspended more than 2 feet 6 inches to 3 feet below the ceiling, else they will produce blackboard glare that hides the figures written thereon. Blackboards with dull or matt-finished surface reduce this glare considerably because they absorb a large per cent of the light. In schools which are used for night-school purposes a new type of lighting unit, which fits directly above the blackboard, further helps to reduce blackboard glare and brings the chalked figures out in distinct relief. To avoid eye fatigue caused by an extreme contrast between the blackboard and the surrounding wall, it is recommended that the lower section of classroom walls, 3 feet above the floor, be finished in a medium light shade having a reflection coefficient of not more than 50 per cent. The upper walls and ceiling should be painted a light cream or white shade having a reflection coefficient of from 75 to 85 per cent. Flat or egg-shell finish is highly recommended. Under no circumstances should high glosses be used for wall and ceiling surfaces as they cause specular reflection and glare.

Special Rooms

General-science rooms, sewing rooms, and chemical laboratories should be lighted to an intensity of 15 foot candles, provided by fixtures which give well-diffused illumination. Much of the accuracy required of the work in these special rooms depends upon the eye judgment of the students, and unless there is even illumination of high intensity, their eyes will falter.

To provide this intensity, these rooms should be equipped with inclosing globe fixtures, burning 300-watt Mazda lamps. They should be suspended at heights of 10 to 12 feet and spaced on 10- to 12-foot centers. Chromium plated or noncorrosion hangers should be used in the chemical and domestic-science laboratories particularly, because they will not be affected by fumes rising from experiments. If the upper areas of the walls and the ceilings are finished in dull paints of light colors, they will reflect light from the fixtures and aid the general illumination in the rooms with an even distribution of light.

Drafting rooms which are used for several periods in night-school work require an intensity of 20 foot candles of highly diffused illumination so that the student can see the fine

UPPER LEFT, Library of the Columbia High School, South Orange, New Jersey, uniformly lighted with enclosing-globe units fitted with 200-watf lamps suspended 9 ft. 6 in. above the floor on 10-ft. centers.
UPPER RIGHT, Woodworking Shop in the Trott Vocational School, Niagara Falls, New York, illuminated with industrial-type reflectors, fitted with 200-watt white bowl lamps mounted 12 ft. on centers.
LOWER LEFT, Bookkeeping rooms lighted with Holophane Prismatic enclosing-globe units burning 200-watt lamps suspended 8 ft. 6 in. above the floor on 12-ft. centers.
LOWER RIGHT, Gymnasium in Immaculate Conception High School, Montclair, New Jersey, fitted with ceiling type enclosing-globe units burning 300-watt lamps, spaced on 15-ft. centers and protected with wire curtains.

lines of his drawing without squinting. Since glare and dark shadows add to his difficulty of vision, it is very important that there be no local lighting for individual desks. Such lights produce glare to neighboring desks and cause a harmful contrast with the general illumination in the room when the student looks up from his board to rest his eyes. Light sources which come within his line of vision produce a sudden change of intensity and cause spots before his eyes, hindering the accuracy of his vision when he returns to his work.

Standard practice recommends that a drawing room installation should have 20 foot candles of illumination. The units should be suspended from 2 to 3 feet from the ceiling and spaced on 10- to 12-foot centers.

Gymnasium Lighting

In the gymnasium, there must be a level of illumination in the area of play, which will permit a speed of vision commensurate with the speed of action in a game of basketball or handball. An intensity of 15 foot candles produced by burning 300- to 500-watt Mazda lamps in inclosing globe units will aid rapid vision. Inclosing globe units like those used in classrooms or glass-steel diffusers, consisting of an inclosing globe with an enamel steel reflector, are recommended for gymnasiums. They should be mounted to the ceiling belt free of the trusses, spaced on 15- to 20-foot centers, and protected with heavy-wire guards.

With the modern practice of students eating their lunches at the school, the newer buildings include a cafeteria which often serves as a recreation room as well. An intensity of 5 foot candles will provide an illumination which assures the cheerfulness desired with one's meals. Inclosing globe units burning 100-watt Mazda lamps and mounted 9 feet 6 inches above the floor on 10- or 12-foot centers will provide this type of lighting.

Corridor lighting for schools follows the recommended practice for hallway lighting in any type of building. An illumination of 5 foot candles produced with inclosing globe units spaced on 20-foot centers and burning 100-watt Mazda lamps will give sufficient light in the school corridors which serve as a locker room. A minimum of shadow and glare is also desired in these areas to prevent collisions with locker doors, accidentally left open.

Over each landing, at the top, turnway, and bottom of stairways, a ceiling-type inclosing globe fixture should be installed to provide ample illumination on the stairways. No economy should be exercised in failing to permit these stairway units to burn on dark mornings or cloudy afternoons.

Shop Lighting

Students beginning shopwork for the first time usually cause much unnecessary wastage

CORRIDOR, IMMACULATE CONCEPTION HIGH SCHOOL, MONTCLAIR, NEW JERSEY
Fitted with enclosing-globe ceiling units spaced on 20-ft. centers.

LIGHTING LIBRARY STACKS WITH LOW CEILINGS
Showcase reflectors with 60-watt lamps on 3-ft. centers at ceiling beams.

of materials and time, the result of mistakes. Sometimes these are a result of poor judgment due to defective lighting. To prevent such conditions a lighting system providing 10 to 12 foot candles of intensity at the work place should be installed. Such illumination will also reduce the danger of accidents in the operation of band saws, planers, and lathes. Inadequate illumination, poorly distributed light, dark areas, and harsh shadows are the chief causes of little slips that result in accidents, and the errors in judgment which cause poor workmanship.

Wood shops or machine shops can be lighted to the recommended intensity by the use of industrial reflectors, burning 200-watt white-bowl lamps. They should be mounted 10 to 12 feet above the floor and spaced on 9- to 12-foot centers so as to give an even distribution of light. The use of flat white paint on the ceilings and walls will reflect most of the stray light from the lighting fixtures and help to give better illumination at the working levels.

The boys' and girls' toilet rooms should be provided with 100-watt ceiling-type white-enameled fixtures with an inclosing globe. In the boiler room a 150-watt white-bowl lamp in a standard dome reflector, suspended 10 to 12 feet above the floor in front of each furnace, will provide sufficient illumination for firing, stoking, and cleaning purposes.

The installation of lighting that complies with the standard recommended practice will not alone give correct lighting. It must be conditioned regularly if the original efficiency is to be maintained. In each city-school system some responsible school executive should have a foot-candle meter with which he can check the intensities in each room with the original requirements. By this practice, he can better determine how often the lighting fixtures should be cleaned.

Maintenance Essential

Generally, regular maintenance consists of wiping the inclosing globes once every two weeks with a clean dry cloth to remove accumulated dust which reduces the transmission of light to the useful areas. Once a month these same units should be removed and washed with a solution consisting of one-half pint of household ammonia to every pail of water, after which they should be wiped dry with a clean cloth. To prevent the lamps from breaking, they should be allowed to cool before cleaning. Especial care should be taken to see that lighting fixtures in the machine shop are not wiped with oily rags, as the thin film of oil left there accumulates dirt very readily. Burned-out lamps in all rooms and laboratories in the school should be replaced immediately, for one bad lamp in a room lighting installation will mar the general efficiency and effect of the entire system. When replacing lamps, the superintendent should see that the new lamps are as near as possible to the socket voltage.

Teachers should turn on the artificial illumination whenever daylight becomes too low for comfortable vision in the room. This is often necessary on stormy days and in the early evening during the winter. To eliminate the human element in this procedure, some schools are adopting the photo-electric-cell apparatus for turning on the room illumination automatically. Placed near the window this mechanism throws a switch which lights the room the minute daylight illumination falls below the level for comfortable vision.

Of course, the prime requisite of school lighting is its utility feature, but the part it plays in the appearance of the interior decorations should not be overlooked. The lighting installation which permits good vision for the students and at the same time improves the interior atmosphere, is the one most helpful to the general mood of students.

While the thoughts herein expressed comply with the standard recommendations of today, they may be old-fashioned a few years hence. Improvements in lighting methods are developed from day to day. Applications of lighting to the new modern art have shown that large pieces of glass lighted from behind by a number of smaller-sized lamps, have a practical value as utility lighting by giving a general illumination of well-diffused light which more nearly parallels that of sunlight. Perhaps in 10 or 15 years, the schoolrooms' lighting installation will consist of ceilings and walls of solid luminous glass.

SCHOOL CONTRACTOR'S RESPONSIBILITY

"Take Public-School Contracts and Go Broke!" is a phrase employed in a recent bulletin issued by the Credit Association of the Building Trades of New York. The bulletin argues that reputable contractors, competent as builders and financially able, do not bid for school contracts because of abuses that are being tolerated.

To be more specific, the complaints arise out of the fact that the general contractor is not called upon to furnish a bond which insures payment to the subcontractor. Thus, for instance, the general contractor who receives payment promptly may delay payment to those who really do the work. The bulletin says:

The average reputable builder, that is, the one who thoroughly understands his business, who pays his bills, who pays the standard wages and employs only the most competent mechanics cannot compete with the contractor who as soon as he secured the contract assigns his payments to some outside party or dummy, and then sits back and twiddles his fingers at his subcontractors when they insist on getting their money. The credit losses sustained by the subcontractor on city building work is too well known to require much comment; in fact, the average reputable contractor shys at the very idea of doing city work, and sellers of materials look with suspicion upon the credit of any concern that suddenly starts taking such work. For years the well-expressed slogan in subcontracting trades has been, "Take Public-School Contracts and Go Broke."

The recommendation is made that legislation be secured whereby the subcontractor will enjoy the same security that now is accorded exclusively to the general contract.

Check List for Six-Grades Elementary Schools

THOMAS J. HIGGINS, Assistant Director of the Bureau of Building Survey, Chicago Board of Education

The present check list is intended to assist school authorities and architects in the preliminary studies of individual rooms in school buildings and in checking the final sketches and the working drawings. Final check lists for junior and senior high schools will be published later during the year 1931.—The Editor.

School .....
Location .....
Date .....
Dimensions of Building .....
Number of Stories .....
Orientation .....
Pupil Capacity .....
Association of Subjects .....

ADMINISTRATIVE SUITE

Location .....
Size .....
Clerk's Space .....
Lavatory .....
Wardrobe .....
Principal's Office .....
Conference Room .....
Storeroom .....
Vault .....
Toilet .....
Public Telephone Booths .....
Radio Control .....
Elec. Program Clock .....
Post Office Boxes .....
Key Case .....
Telephone .....

AUDITORIUM

Location .....
Number of Seats .....
Balcony .....
Adaptable to Public use .....
Public Foyer .....
Men's and Women's Toilets .....
Drinking Fountains .....
Motion-picture Booth .....
Stage .....
Size .....
Footlights .....
Border Lights .....
Proscenium Arch .....
Orchestra Pit .....
Dressing Rooms .....
Scenery Storage .....
Acoustics .....
Broadcasting System .....
Clock .....

GYMNASIUM

Number .....
Location .....
Adaptable to after-school use .....
Adjoining Playground .....
Orientation .....
Size .....
Ceiling Height .....
Bleachers .....
Glass Area .....
Type of Windows .....
Height of Sill above Floor .....
Toilets .....
Drinking Fountains .....
Recessed Ceiling Lights .....
Kind of Floor .....
Kind of Walls .....
Sound-deadening Material in Ceiling
Plug Receptacle for Lantern .....
Radio Outlet .....
Physical Director's Office .....
Telephone .....
Clock .....
Storeroom and Apparatus Room ..
Equipment .....

CLASSROOMS

Number .....
Number of Pupils .....
North Light .....
East Light .....
South Light .....
West Light .....
Size .....
Ceiling Height .....
Glass Area .....
Kind of Glass .....
Unilateral .....
Type of Windows .....
Height of Sill above Floor .....
Kind of Floor .....
Kind of Walls .....
Number of Doors to Corridor .....
Recessed in Corridor Wall .....
Size and Type of Glass in Doors
Transoms over Doors .....
Number of Seats .....
Adjustable .....
Teachers' Cases .....
Recessed .....
Writing Boards .....
Color .....
Material .....
Number of Lineal Feet .....
Front Wall .....
Side Wall .....
Rear Wall .....
Corkboard .....
Type of Artificial Lighting .....
Telephone .....
Plug Receptacle for Lanterns .....
Radio Outlet .....
Clock .....

KINDERGARTEN

Number of Pupils .....
Orientation .....
Size .....
Ceiling Height .....
Glass Area .....
Kind of Glass .....
Unilateral .....
Type of Windows .....
Height of Sill above Floor .....
Kind of Floor .....
Kind of Walls .....
Number of Doors to Corridor .....
Recessed in Corridor Wall .....
Size and Type of Glass in Doors
Transoms over Doors .....
Door to Exterior Play Space .....
Boys' Toilet .....
Girls' Toilet .....
Lavatories .....
Wardrobes .....
Storeroom .....
Teachers' Cases .....
Recessed .....
Teachers' Wardrobe .....
Recessed .....
Storage Cases .....
Recessed .....
Writing Boards .....
Color .....
Material .....
Number of Lineal Feet .....
Corkboard .....
Type of Artificial Lighting .....
Telephone .....
Plug Receptacle for Lantern .....
Radio Outlet .....
Clock .....

GIRLS' VOCATIONAL ROOM

Number .....
Number of Pupils .....
Size .....
Ceiling Height .....
Glass Area .....
Unilateral .....
Type of Windows .....
Height of Sill above Floor .....
Kind of Floor .....
Kind of Walls .....
Number of Doors to Corridor .....
Recessed in Corridor Wall .....
Size and Type of Glass in Doors....
Transoms over Doors .....
Number of Tables .....
Number of Seats .....
Number of Volumes .....
Kind of Stacks .....
Artificial Lighting .....
Type .....
Book-repair Room .....
Storeroom .....
Telephone .....
Clock .....
Bulletin Board .....
Plug Receptacles for Lantern .....
Radio Outlet .....

TOILET ROOMS

Number .....
Location .....
Number of Water Closets — Girls'
Number of Water Closets — Boys'
Number of Urinals .....
Number of Lavatories .....
Liquid Soap .....
Electric Dryers .....
Kind of Floor .....
Kind of Walls .....

ENTRANCE FOYER

Size .....
Bulletin Boards .....
Seats .....

CORRIDORS

Width .....
Ceiling Height .....
Fireproof .....
Kind of Floor .....
Kind of Wainscot .....
Recessed Lockers .....
Number of Lockers .....
Size of Lockers .....
Ventilated .....
Recessed Rubbish Receptacle .....
Recessed Drinking Fountain .....
Number .....
Janitors' Closets .....
Clocks .....

STAIRWAYS

Number .....
Location .....
Fireproof .....
Width .....
Height of Riser .....
Width of Tread .....
Type of Tread .....
Handrails .....

SPECIAL FACILITIES

Fire Alarms .....
Automatic .....
Fire Hose in Corridors .....
Panic Bolts on Exit Doors .....
Electric-clock System .....
Bells in Corridors .....
Bells on Exterior of Building .....
Vacuum-cleaning System .....
Incinerator .....

SPECIAL ROOMS

Teachers' Restrooms .....
Teachers' Toilets .....
Locations .....
Teachers' Lunchroom .....
Kitchen .....
Clinic .....
Location .....
Equipment .....
Engineers' Office .....
Janitors' and Helps' Room .....
Toilets .....
Basement used for Classrooms .....

HEATING AND VENTILATING

Method of Heating and Ventilating ....
Building Heated and Ventilated in Units
Boiler Room .....
Location .....
Fireproof .....
Kind of Boilers .....
Coal Storage .....
Stokers .....
Fans .....
Kind of Power .....
Thermostatic Control .....
Air Washer .....
Humidifier .....
Height Fresh-air Intake above Ground ..

N.E.A CANDLE OF EFFICIENCY

Instruction 50%
Stairs and Corridors 20%
Administration 16%
Walls and Partitions 10%
Flues 3%
Accessories 1%

THE EDUCATIONAL ENGINEER

The planning of a new school building should have its beginning with the educational consultant or, as he is more popularly called, the educational engineer. Dr. Harry P. Smith, of the Syracuse University, says that such educational engineer may or may not be an architect, but he must know the building and equipment requirements for achieving educational ends. In other words, he must be a school-building and equipment expert. In outlining the function of the educational engineer, Dr. Smith says:

"When a new building is projected, he studies the population, registration, and forecasts, the aims to be achieved, and the program of education to be carried on to achieve those ends. In the light of these factors he makes out a schedule of rooms and equipment. This schedule includes a statement of the number of rooms needed, their size, capacity, equipment, and location with reference to other rooms. Certain specifications relative to type, general characteristics, and arrangement of the plant should be included.

"Then, and then only, should the practicing architect proceed with the architectural and engineering specifications. Sometimes it happens that an architect specializes in school buildings and has attached to his office educational consultants who may render the sort of service indicated above. In that event his organization may perform every service needed in connection with school buildings. But there are probably less than a score of such architects' organizations in this country.

"The primary function of the architect and his organization is to embody the educational specifications in the form of working drawings and specifications. At every stage, however, there should be the closest coöperation between the architect and educational consultant to the end that the completed building may represent that perfect harmony that must exist between structure and function in the modern educational plant.

"The educational engineering side has loomed so large in many cities that school-planning departments have been developed whose function it is to prepare the educational specifications. It may have an architectural organization.

"A further function is the studying of old structures too good to 'scrap' and yet not adapted to modern educational needs with a view of remodeling them and erecting additions. Such service is of estimable value to any large city. Here, as well as in new construction, the services of the educational consultant or educational engineer are well-nigh indispensable.

"Modern education requires more and larger facilities and more and larger sums of money to finance these activities. Any type of activities which secures a more harmonious relationship between function and structure, resulting in the better education of American childhood is worthy of the most serious consideration."

COOKING ROOM, SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts

THE NEW HIGH SCHOOL, WESTFIELD, MASSACHUSETTS

Westfield is a city of 20,000 population located in the western section of the State of Massachusetts. The city has 65 separate industries, ranging from small novelty shops to the leading industry, the H. B. Smith Co., makers of furnaces and radiators. As early as 1923 the school committee had outlined a building program deciding on a four-year high school as the first unit to be built. In December, 1928, bids were received for the new building, and the contract was immediately let. The building was occupied September 15, 1930, for the first time.

The architect was chosen by the building commission. Mr. Malcolm B. Harding, a local architect with considerable experience in building schoolhouses, was their choice. The basic studies for the planning of the building were first made by the superintendent of schools, Mr. Chester D. Stiles, and then submitted to the educational advisers, Dr. Geo. D. Strayer and Dr. N. L. Engelhardt, of Columbia University. After a conference with the architect and the superintendent of schools the preliminary plans were drawn with the school program in view. The purpose was to secure the necessary accommodations for conducting the curriculum with as little waste space as possible.

The building is a 3-story structure without basement and is constructed to accommodate later additions that may be needed in the rear. There are 20 classrooms, a conference room, 2 rooms for the commercial department, 3 laboratories, 2 domestic science rooms, 2 manual training rooms, a library with workroom and office, 2 rooms for art, an office suite, a health room and clinic, a girls' restroom, and a teachers' room. There are also an auditorium seating 1,000, a gymnasium 60 by 90 ft., a cafeteria 40 by 75 ft. and 2 shops.

The building is of the slow-burning type. The footings are concrete and the walls are of brick and tile throughout. The stairways are of steel and concrete, and the heating plant is separated from the main building by heavy concrete construction. The classroom floors and the roof are of steel-joist construction. Ventilation is of the unit ventilator type. Corridor and toilet floors are terrazzo, and all classrooms and special rooms have linoleum floor covering except the woodworking room and the general shop where the blox-on-end type of factory floors are used.

The site is superb. The building is located on the edge of an old river terrace overlooking the city. It is just outside the congested building area and has an abundance of open land on

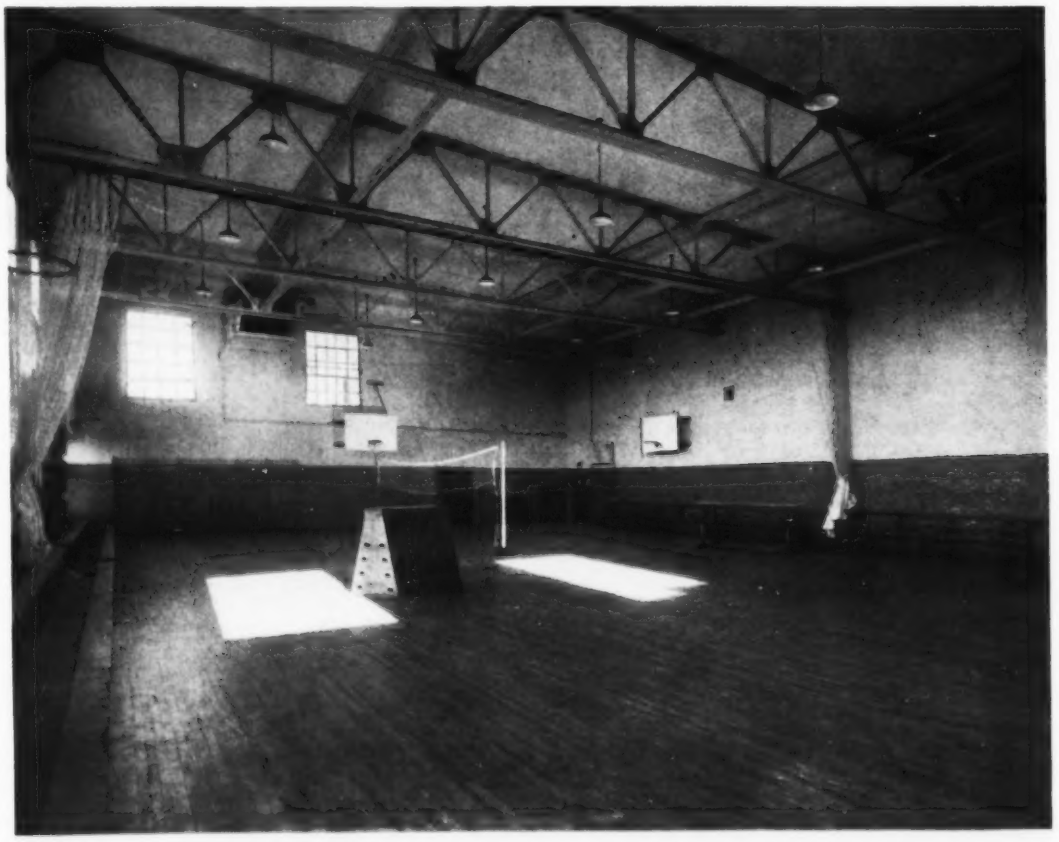
AUDITORIUM, SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts

SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts

three sides. In front is the public park and playground. A school athletic field will be developed in the rear, containing baseball and football fields and a running track. The selection of this site was contested strenuously for three years. There is now, however, a general approval on the part of the citizens. Their present attitude is a justification of the good judgment of the building commission.

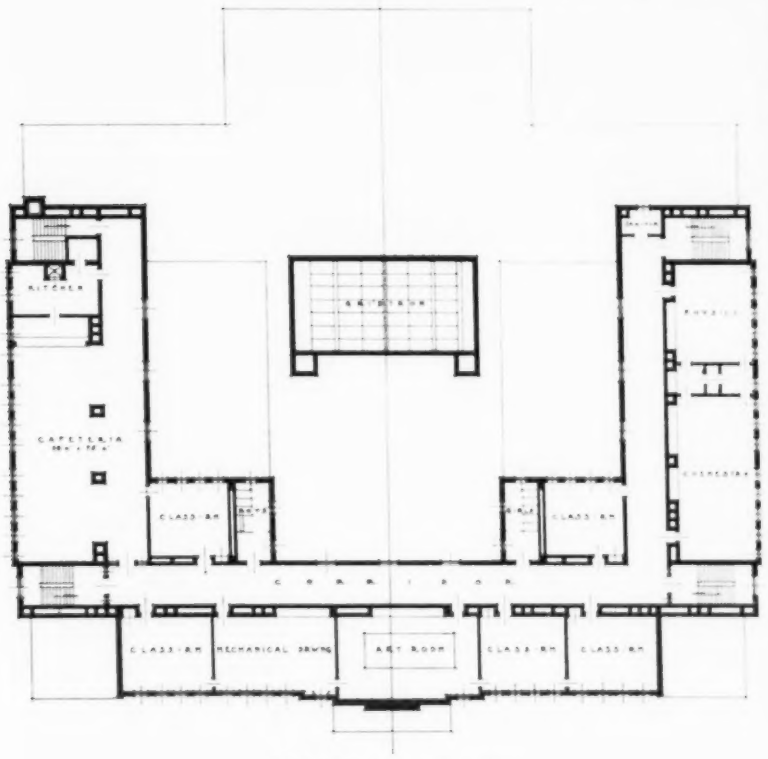
The cost of the building, equipment, and grading was $535,461, or 31.7 cents per cubic foot.

Name of School	Westfield High School
City	Westfield
State	Massachusetts
Architect	Malcolm B. Harding
Address	Westfield, Massachusetts
Superintendent of Schools	Chester D. Stiles
Construction Data	
Bids received	December, 1928
Contract awarded	December, 1928
Construction started	March, 1929
Building occupied	September 8, 1930
Working days required	413
The Site	
Dimensions	420 by 791 ft.
Principal frontage	Smith Avenue 791 ft.
The Building	
Use of building	Senior High School
Classrooms	20
Commercial department	2
Number of laboratory rooms	3
Domestic science	2
Manual training	2
Library reading room	1
Librarian's office	1
Librarian's workroom	1
Study rooms	0
Commercial art	1
Fine arts	1
Public speaking	0
Music room	1
Offices	1
Book storage	1
Matron	1
Nurse	1
Dental room	1
Clinic	1
Girls' restroom	1
Teachers	1
Size of Larger Rooms	
Auditorium	61 by 68 ft.
Seating capacity	1000
Gymnasium: Size	60 by 90 ft.
Seating capacity	600
Cafeteria	40 by 75 ft.
Design and Construction Materials	
Exterior design	Georgian Colonial
Exterior facing	Face-brick
Exterior trim	Art marble
Constr. material	Brick, concrete, tile, steel, and steel joints
Corridor and stair finish	Terazzo floors, face brick
Classroom finish	Hard plaster, metal trim linoleum floor covering
Auditorium finish	Same
Gymnasium finish	Brick side walls, maple floor
Finish of toilet rooms	Terrazzo floor, metal partitions and trim
Mechanical Equipment	
Type of heating and ventilation	Mechanical exhaust and classroom vent unit
Temperature control	Automatic
Electrical equipment	Standard time clocks, fire alarms, inter-communicating telephones
Plumbing and sanitary equipment	Vitreous china
Cost and Pupil Capacity	
Pupil capacity of building	1000
Number of pupil stations	3
Cost of building	$416,670.00
Cost of equipment	$59,842.00
Total cost	$535,461
Cost per cubic foot	31.7
Cost per pupil	$476.51
Total cost per pupil	$535.46



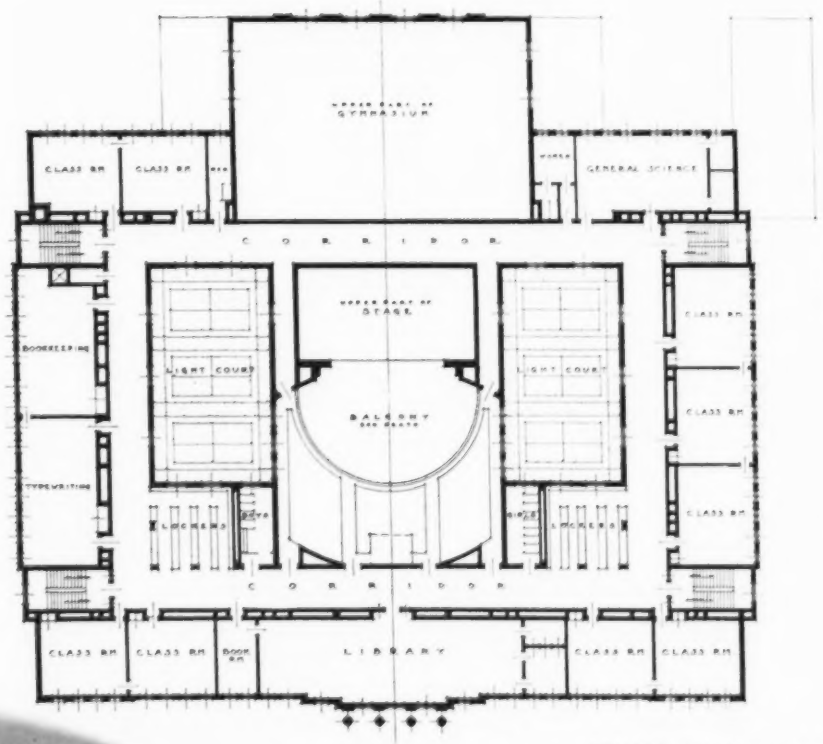
GYMNASIUM, SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts

SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts

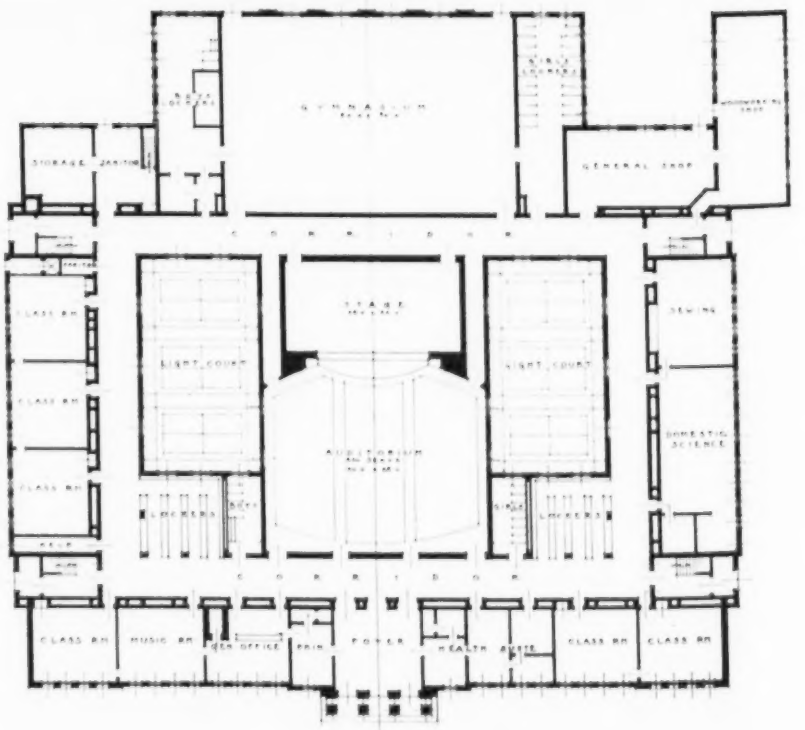


SECOND FLOOR PLAN

PHYSICS LABORATORY

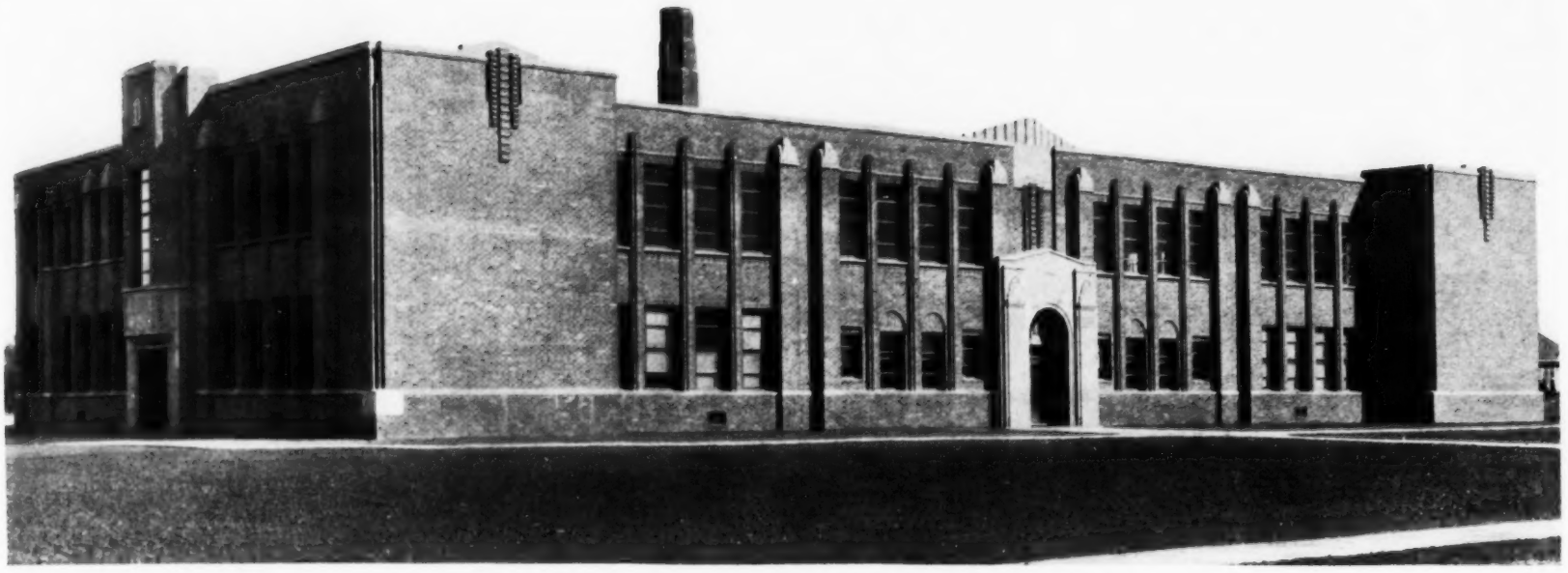


FIRST FLOOR PLAN

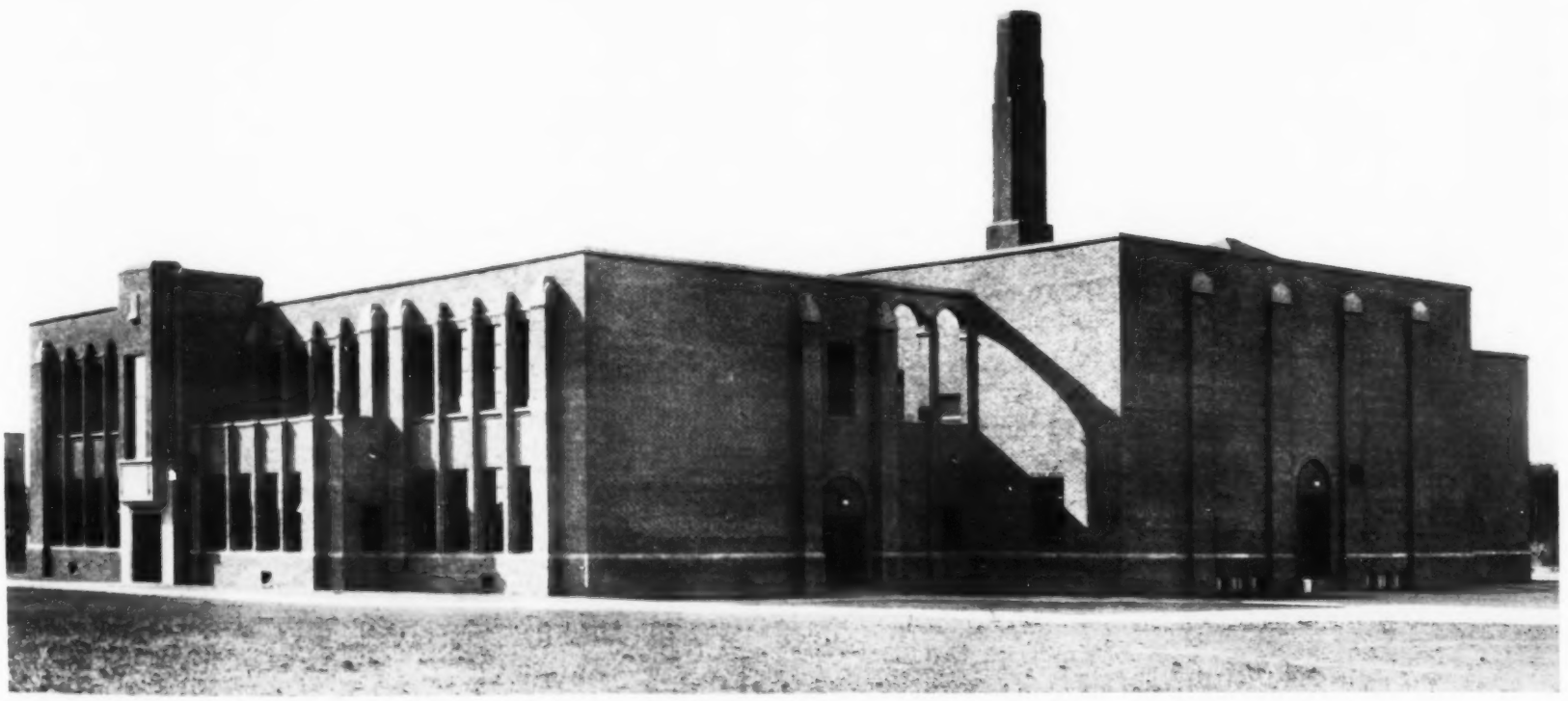


GROUND FLOOR PLAN

SENIOR HIGH SCHOOL, WESTFIELD, MASSACHUSETTS
Malcolm B. Harding, Architect, Westfield, Massachusetts



FRONT VIEW, DENKMANN SCHOOL, ROCK ISLAND, ILLINOIS
Horn and Sandberg, Architects, Rock Island, Illinois



REAR VIEW, DENKMANN SCHOOL, ROCK ISLAND, ILLINOIS
Horn and Sandberg, Architects, Rock Island, Illinois

A GRADE SCHOOL IN MODERNISTIC STYLE

J. J. Hagan, Superintendent of Schools, Rock Island, Ill.

The Rock Island school system is organized on the six-three-three plan, with the kindergarten and the first six grades in the elementary schools. From the fourth grade upward, the schools are completely departmentalized.

The new Denkmann School, which has been erected in the spirit of the modernistic design, is an elementary school having a kindergarten and the first six grades. The departmental program requires especially-equipped rooms for social science, art, and music, and a combined auditorium and gymnasium.

The building has been planned for future growth to meet the estimated increase in the population of the district which it serves. The upper story of the building which contains space for ten classrooms has been built but is not finished, and for the immediate present only the eight rooms on the first floor are occupied. The section of the city is growing so rapidly, however, that the school authorities have felt themselves justified in completing the building to the extent just described. It will be noted from the plans that additions are contemplated as wings at the rear of the building. It is expected that these wings will include eighteen classrooms so that the building will have a total capacity of 36 rooms when entirely completed.

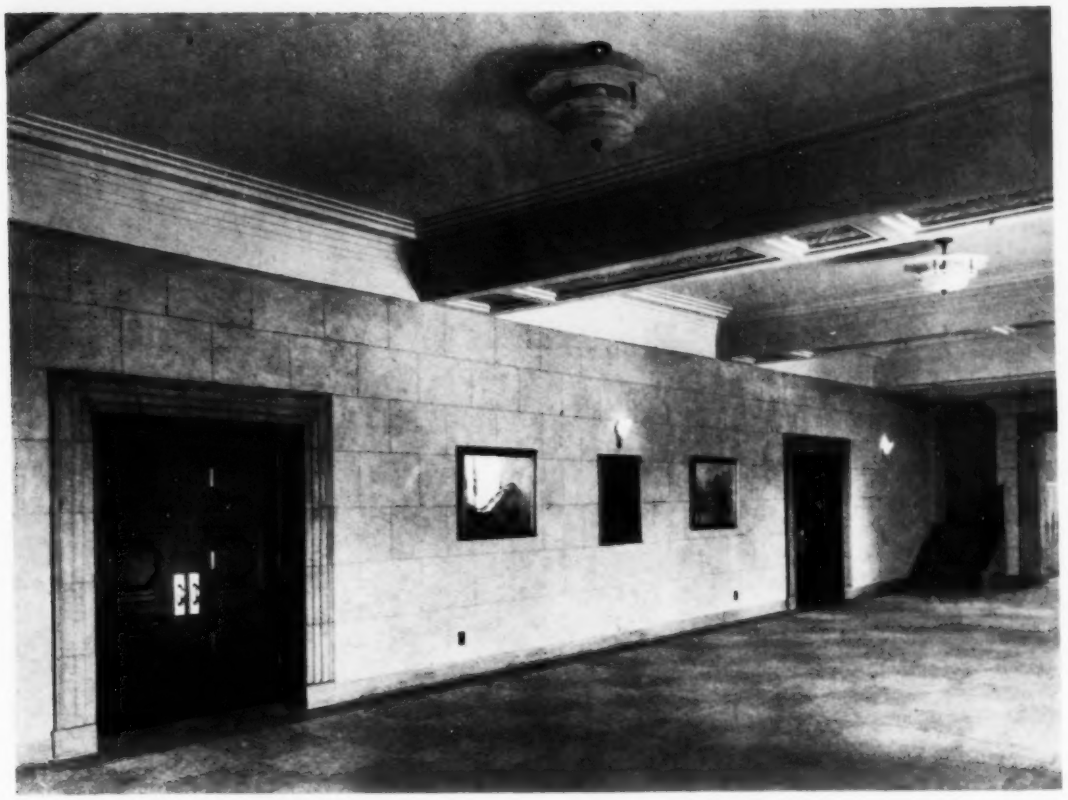
The school is a two-story building of fireproof construction, containing 631,667 cu. ft. It was erected at the low cost of 26 cents per cubic foot, due in part to the fact that the top floor is not completed.

The foundations are constructed of reinforced concrete; the walls of the superstructure are hollow tile, faced on the exterior with brick, and trimmed with colored cast-stone. The floors and the roof construction are of reinforced concrete, except the auditorium roof which is structural steel, trusses, beams, and steel decks. The roofs are insulated with 1 in. of board insulation.

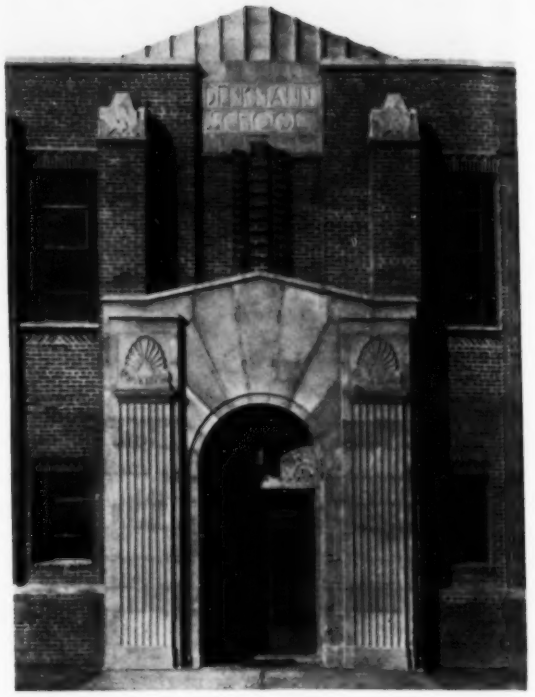
The classrooms, auditorium, etc., are plastered and contain a minimum of hardwood trim. The floors are of asphalt tile in pleasing colors. The corridors and the memorial hall have terrazzo floors.

The modern design of the exterior is carried into the Denkmann memorial hall and the gymnasium-auditorium. The motif which has been used throughout is of Greek origin. The building is heated by means of a vacuum-steam system, using oil fuel in centrifugal burners. The classrooms and the auditorium-gymnasium are ventilated by means of unit ventilators, equipped with automatic temperature control.

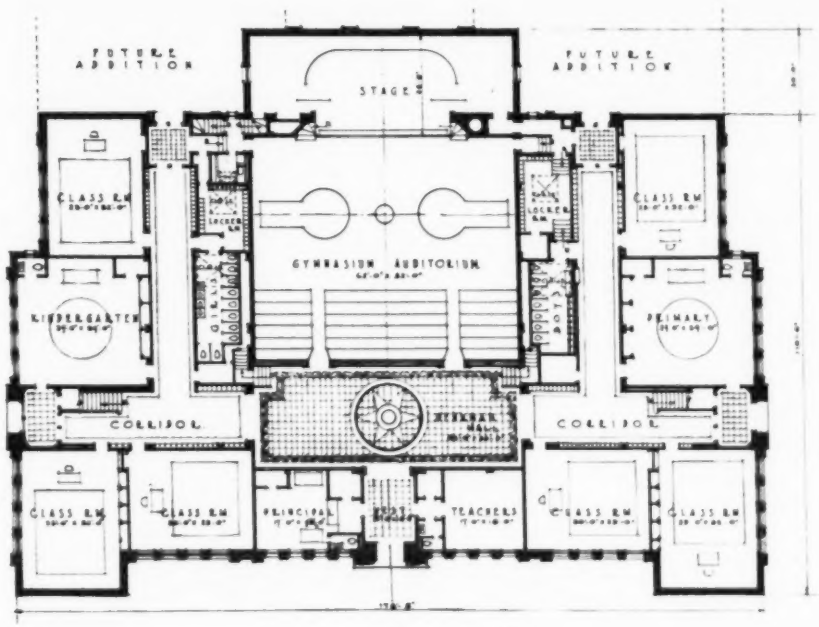
The building was planned by Messrs. Horn & Sandberg, architects, of Rock Island, Ill.



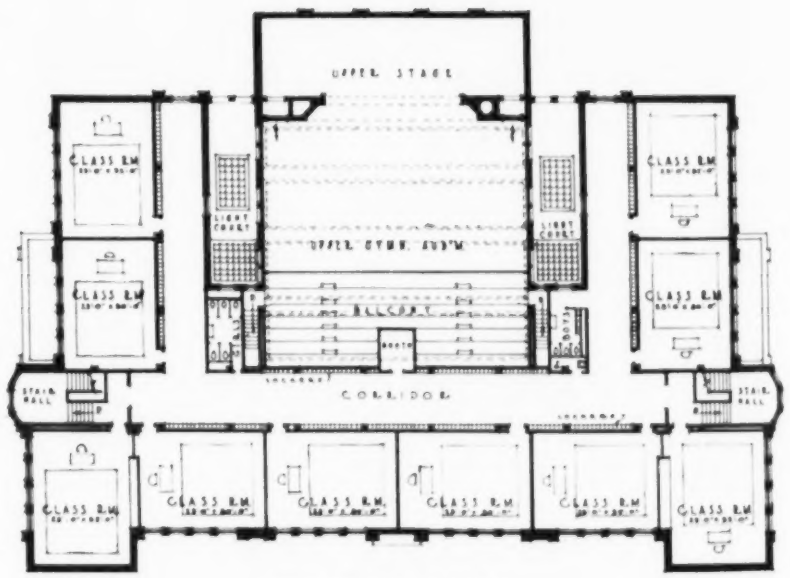
LOBBY, DENKMANN SCHOOL, ROCK ISLAND, ILLINOIS



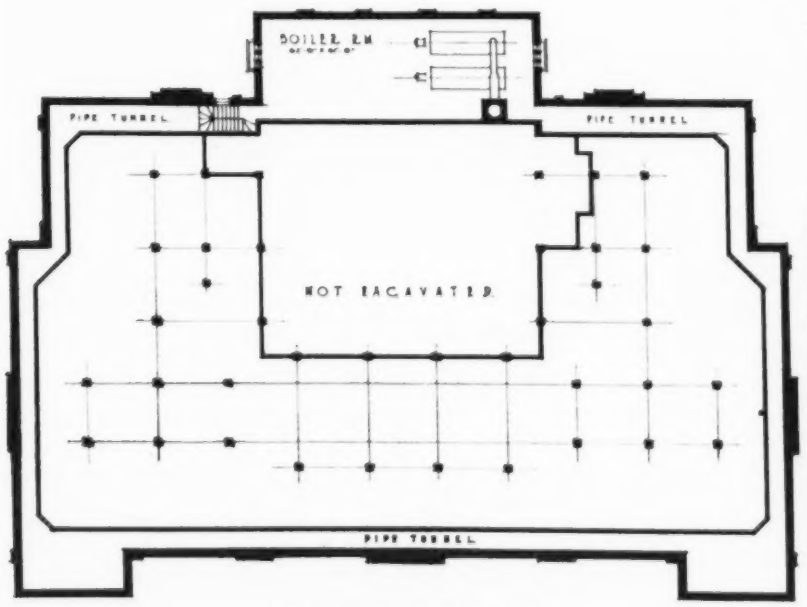
ENTRANCE DETAILS, DENKMANN SCHOOL, ROCK ISLAND, ILLINOIS



FIRST FLOOR PLAN



SECOND FLOOR PLAN

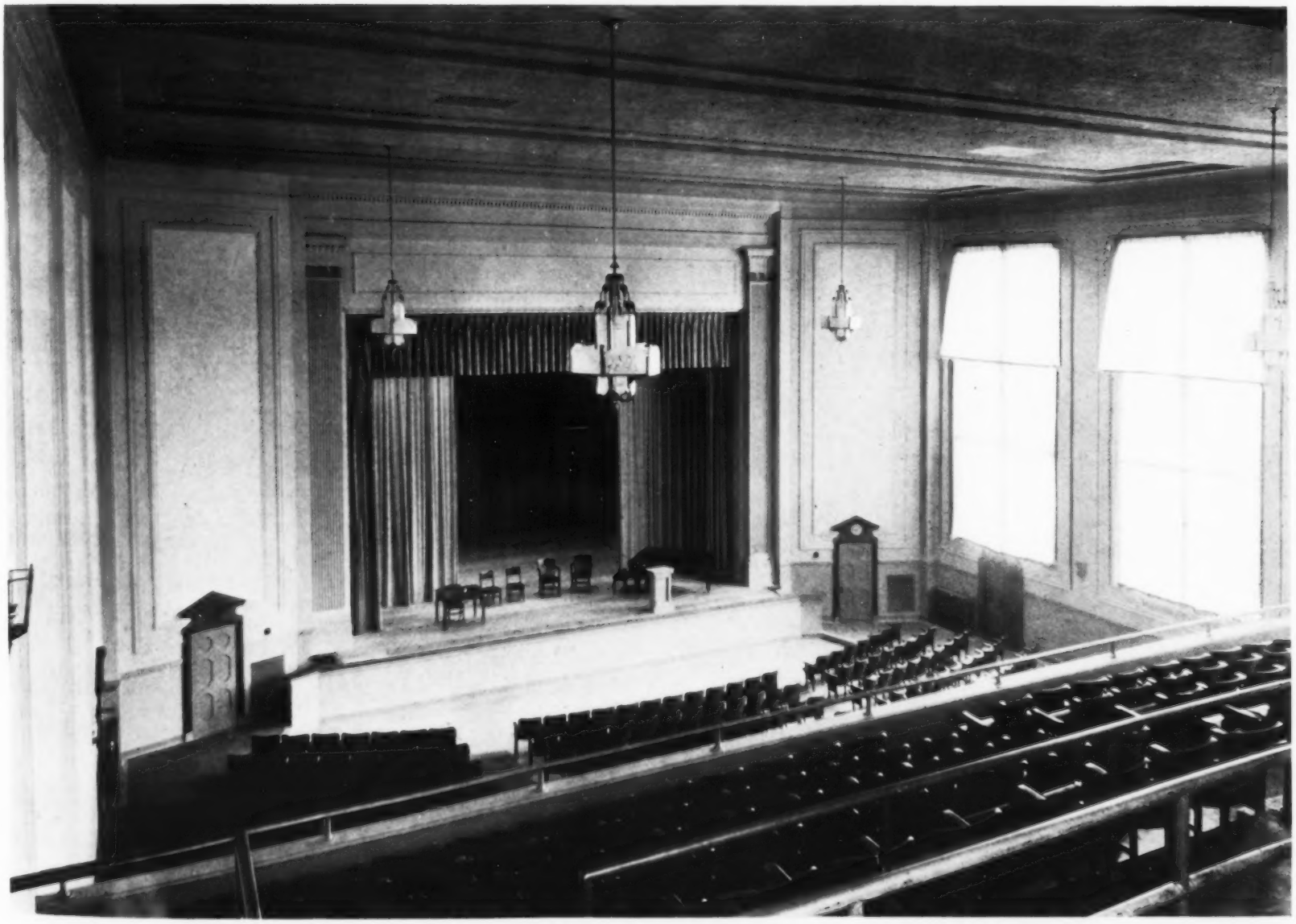


BASEMENT FLOOR PLAN

TYPICAL CLASSROOM

DENKMANN SCHOOL, ROCK ISLAND, ILLINOIS
Horn and Sandberg, Architects, Rock Island, Illinois

WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

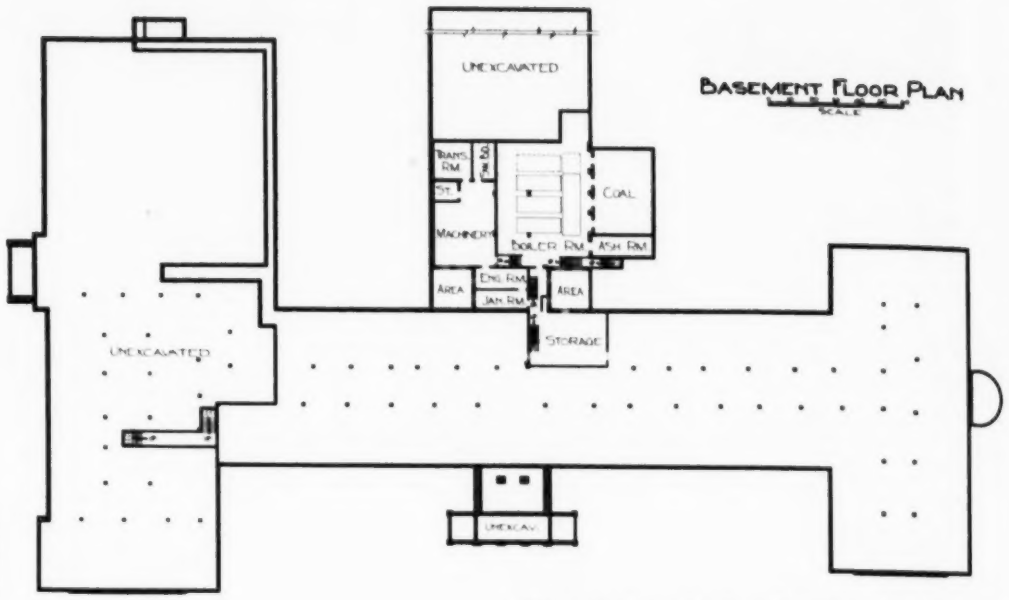


AUDITORIUM, WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

THE NEW WEST HIGH SCHOOL, MADISON, WISCONSIN

John Dixon

There are obviously numerous considerations which the architects of such a building as the new West High School of Madison, Wisconsin, must keep in mind. First, there are established principles of design for high-school buildings which must have due consideration; then there are the architects' conceptions of features which the building should emphasize; the height, width, length, and shape must harmonize not only with the area and configuration of the land, but with the buildings near by; there must be beauty without sacrifice of utility; the building must achieve a maximum of convenience, usableness, and advantage for the students, and for their accompanying users, the teachers and the executive staff; there are numerous extra-scholastic or community uses which the people expect in such a building; and, finally the taxpayers have a right to demand that the building shall be worth the money put into it.



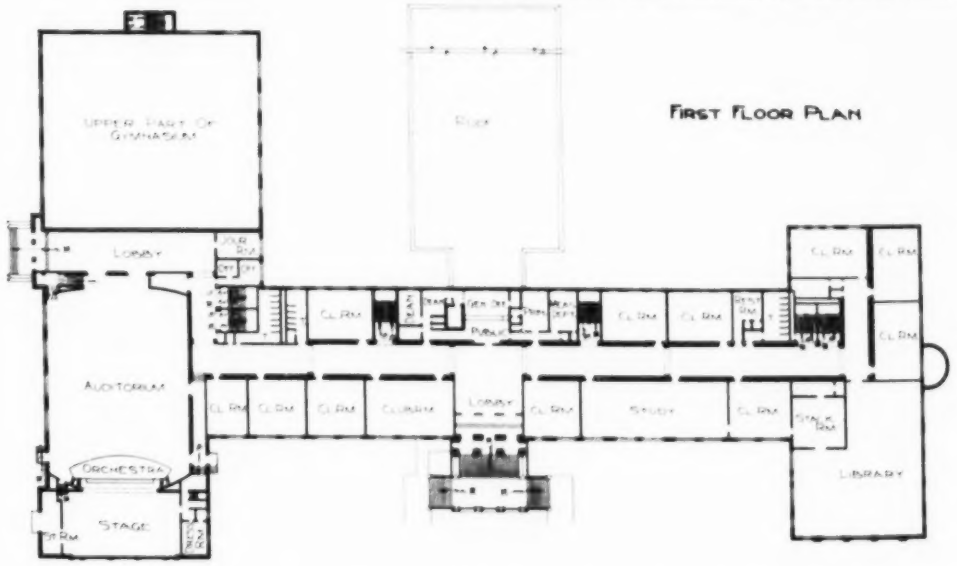
What is there in the planning of this building to make a special appeal to the teachers of special departments?

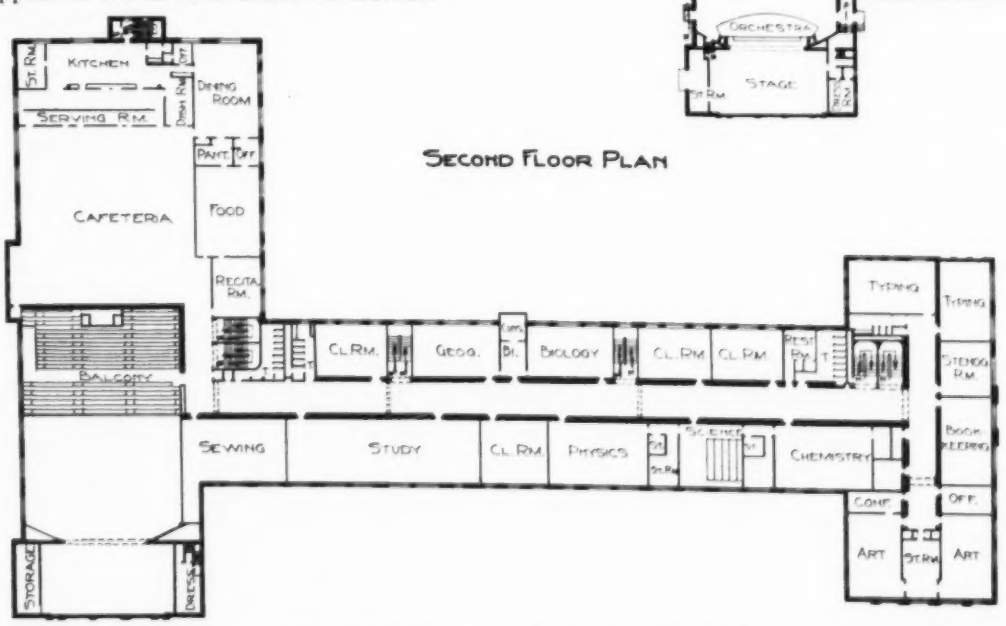
What is there in the plan of the building to make a legitimate appeal to the taxpayer?

The Architects' Problems

Mr. E. J. Law, both in writing and orally, gave answers in detail to these questions. Speaking of the artistic motif governing the design Mr. Law said: "We tried to design the West High School so that it would have the proper relation to the community of which it is the center. For this reason we adopted the Georgian or Colonial style. The building is the center of a large residential section, many homes of which are done in the Colonial style. This style offers the best medium for keeping a large building in the closest scale with the surrounding homes. The color contrasts are simple, but effective. We have aimed at a balanced utility and beauty. Later, when there is a framing of trees and vines, and the rock garden, designed by Professor Aust, of the University of Wisconsin, has been fully developed, the element of beauty will assume a greater prominence than it has now. Appropriateness, dignity, and beauty, without sacrificing utility, best expresses the artistic motif of the design of this building."

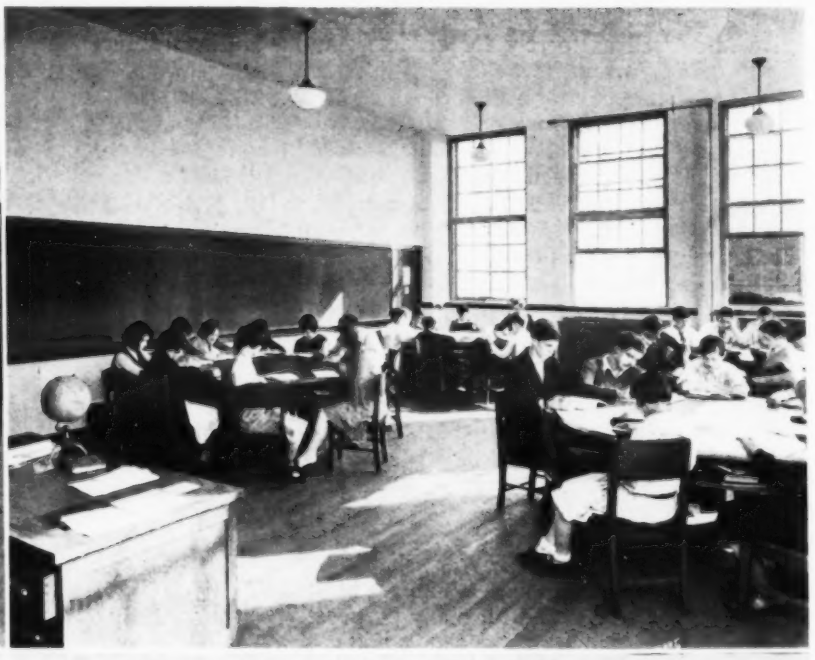
Of the practical considerations, Mr. Law said: "Workability of the plan is vital to its success. This carries with it such matters as: (*a*) distribution of the stairs to reduce travel distance; (*b*) location of the library so as to be readily accessible to all; (*c*) location of the gymnasium and auditorium to be well situated for outside activities without use of the rest of the school; (*d*) location of the cafeteria over the gymnasium to eliminate cooking odors and noise, and to make joint use possible with the auditorium, without opening the rest of the school."

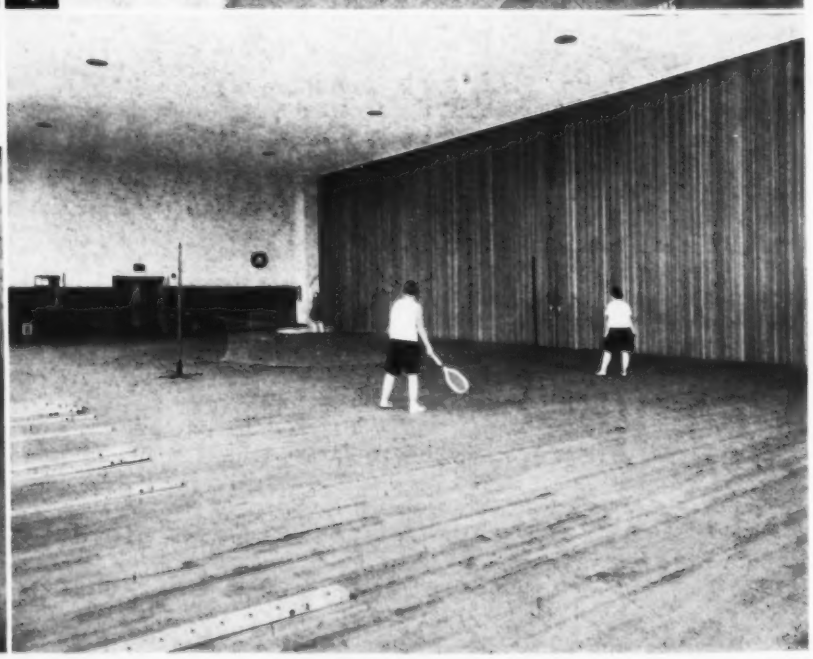




WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

AIRPLANE VIEW, WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin





INTERIOR VIEWS OF THE WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin
TOP, Entrance Lobby and Reading Room; BOTTOM, Library and Girls' Gymnasium.

WOODWORKING SHOP, WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

Of the features which make the building essentially 1930 in structure and design, he said: "The high school of today is a building which has *a flexible use of rooms* for outside activities as well as merely for academic and special studies. It must have a good gymnasium, music department, and other rooms which meet the needs of the 1930 school program. The double use of the school equipment is exemplified in the use by both school and public of the stage and auditorium. Also, adequate playgrounds are an integral part of the modern school. The construction of the building is flexible in this that *the interior partitions are removable and any change or rearrangement of rooms may be made to meet future requirements.*"

The Appeal to the Teacher

In answer to the question, on the special appeal of the building to the modern academic teacher, the architect said: "The classroom is the teacher's laboratory. Therefore we have tried to furnish convenient and adequate space for the teaching apparatus. There is shelf room and closet room in abundance. There are built-in cases of many kinds and for many purposes. In the science department especially, material can be properly placed, and kept in orderly arrangement.

"We have worked on the principle that the teachers themselves know best their actual needs. We consulted teachers and heads of departments as to the exact needs of the various subjects, and met these demands to the fullest extent possible.

"The modern school must meet the specialized needs of the special departments, as of music, mechanics, etc. Each of these departments requires consideration as to location with regard to other departments, and to make the space adaptation fit the latest developments of modern equipment. Here also, heads of departments and teachers were asked to submit needs and plans, and these were incorporated in the plans.

"There are several features of the construction which should appeal to the interested taxpayer. Some of these are: (*a*) the planning of the building to give the public use of the buildings and grounds without interference with the business of the school; and (*b*) the low unit cost of construction."

The vital consideration in a school building is plainly the area devoted to instructional purposes. In the West High School the area devoted to instruction has been increased from the National Education Association standard of 50 per cent, to 60 per cent, an increase of one fifth.

At the front, four beautiful pillars with Ionic capitals emphasize the entrance. There is nothing aggressive in this entrance, no austere guardianship of the way in, but rather a suggestion of welcome and of beauty within. Passing through one of the doors, the main office is directly ahead. The vestibule is finished in oak paneling and flanked with cabinets to exhibit trophies. The administrative department includes the general office, the principal's office, the vice-principal's office, and two other offices.

The Floor Plans

On the first floor there are 12 classroom units, a teachers' room, 3 consultation and conference rooms, a stationery room, 4 toilets; the library, 60 by 70 feet; a study hall, 26 by 70 feet to accommodate 150 students; the auditorium, 65 by 92 feet, seating 835; a stage, 29 by 53 feet; and dressing rooms.

On the ground floor there are 20 classroom units, an office, conference room, teachers' room, pottery room, 4 pupils' toilets, 2 storage rooms; 2 gymnasiums, 50 by 88 feet, with removable partition; 2 auxiliary gymnasiums, 19 by 39 feet and 29 by 32 feet respectively; 2 examination rooms; 2 physical directors' rooms; girls' shower and locker room; boys' shower and locker room; drying room; visiting team room; printshop, 30 by 36 feet; machine and sheet-metal room, 30 by 62 feet; woodworking room, 43 by 69 feet; automotive and electrical room, 30 by 63 feet; drafting room, 30 by 43 feet; office, 2 storage rooms.

On the second floor there are 19 classroom units, offices and conference rooms, teachers' room, 4 toilet rooms; a study hall, 26 by 70 feet, to accommodate 150; a cafeteria and study hall, 63 by 73 feet; cafeteria kitchen, serving room, dishwashing room, lockers, dressing room, storage room; and the auditorium balcony, seating 446.

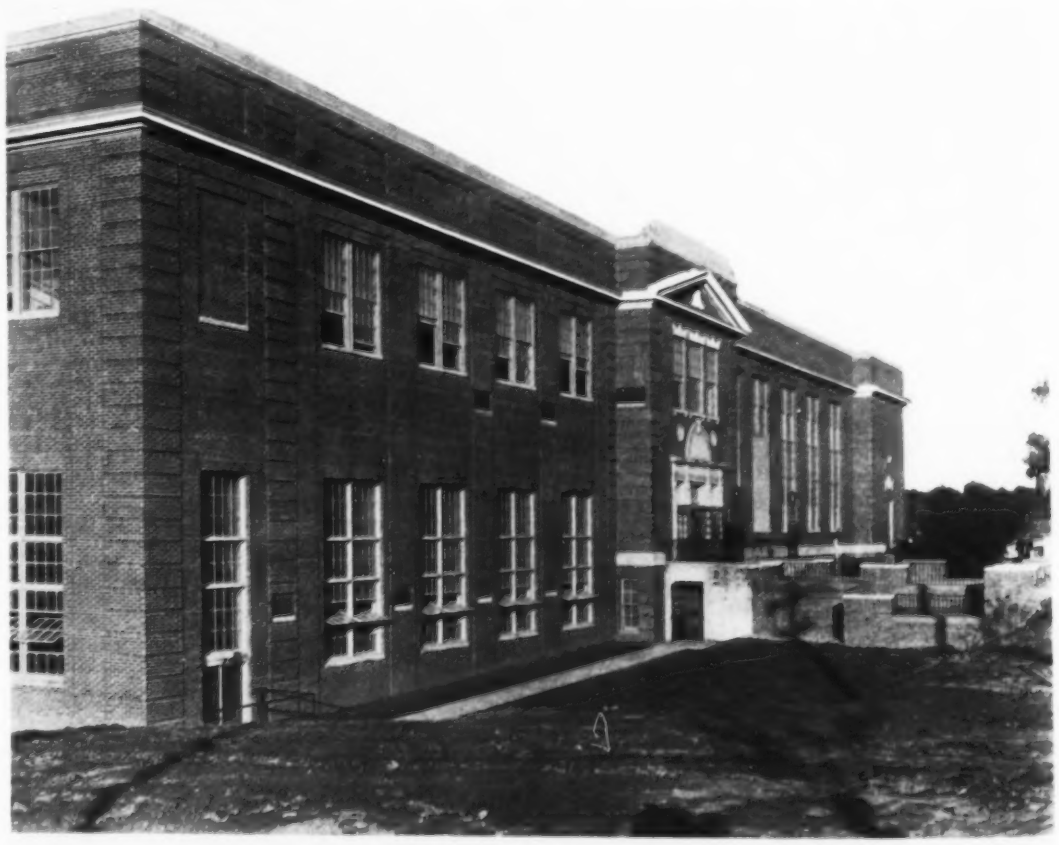
On the third floor there is a chorus room, 35 by 38 feet; orchestra room, 35 by 48 feet; 2 practice rooms.

It is planned that the school will house 750 pupils in the junior-high-school department on the ground floor and an equal number of senior-high-school students on the first and second floors. Both sections will have ready access to the auditorium, gymnasium, and laboratory departments.

Special Features

There are numerous individual features of the building which are so valuable as to deserve mention. Space will permit only casual reference. The auditorium is in every respect a fine example of what a modern school auditorium can be made artistically, acoustically, and as a useful center of school and community life. The room is simple and dignified, and the color

(Concluded on Page 129)



WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

Ultimate Physical Plant Programs

Geo. F. Womrath, Minneapolis

The scientific techniques and criteria, which have emerged from the research work conducted during the past decade in projecting public-school physical plant programs have made it not only possible but very probable that the generally accepted 5-year building program for cities soon will be superceded by a physical plant program covering a 25-year period, or in some respects even an ultimate program.

Adoption of educational policies by school boards; the application of occupational and school population indices; coöperative agreements with park and welfare boards, city planning commissions, and other organizations interested in the development of cities and the recreational activities of youth; and the use of other well-established criteria, including school census and attendance records, enable the informed school administrator to prepare with reasonable accuracy an all-time public-school physical extension program. In the absence of a definite educational policy and program, the development of a school system can be guided on its course with as little accuracy as can a ship without a rudder.

Steps to be Taken

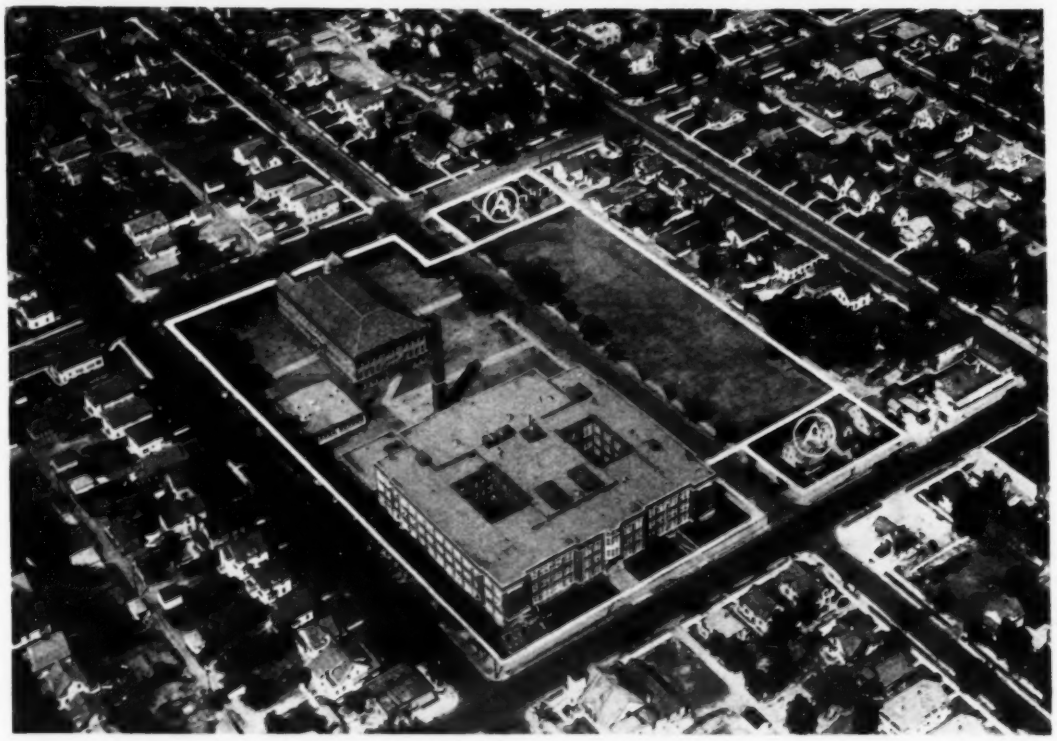
The Minneapolis public-school system may be used to illustrate specifically how ultimate physical plant programs may be set up by the application of the factors indicated.

The educational policy adopted by the Minneapolis school board includes elementary schools, junior high schools, and senior high schools, or the 6-3-3 school plan, the desirable maximum walking distance for pupils attending each type of school, the desirable optimum capacity for each type of school, and the desirable minimum size of playgrounds for each type of school.

Population indices have been ascertained.[1] That is, a school population index figure for each type of school has been worked out for every section of the city. The index varies in different parts of the city, being dependent upon the classification of areas: residential, apartment, mansions, light commercial, industrial or heavy commercial, park areas, public buildings, and vacant; also, nationality of residents, religious attitudes, and economic status.

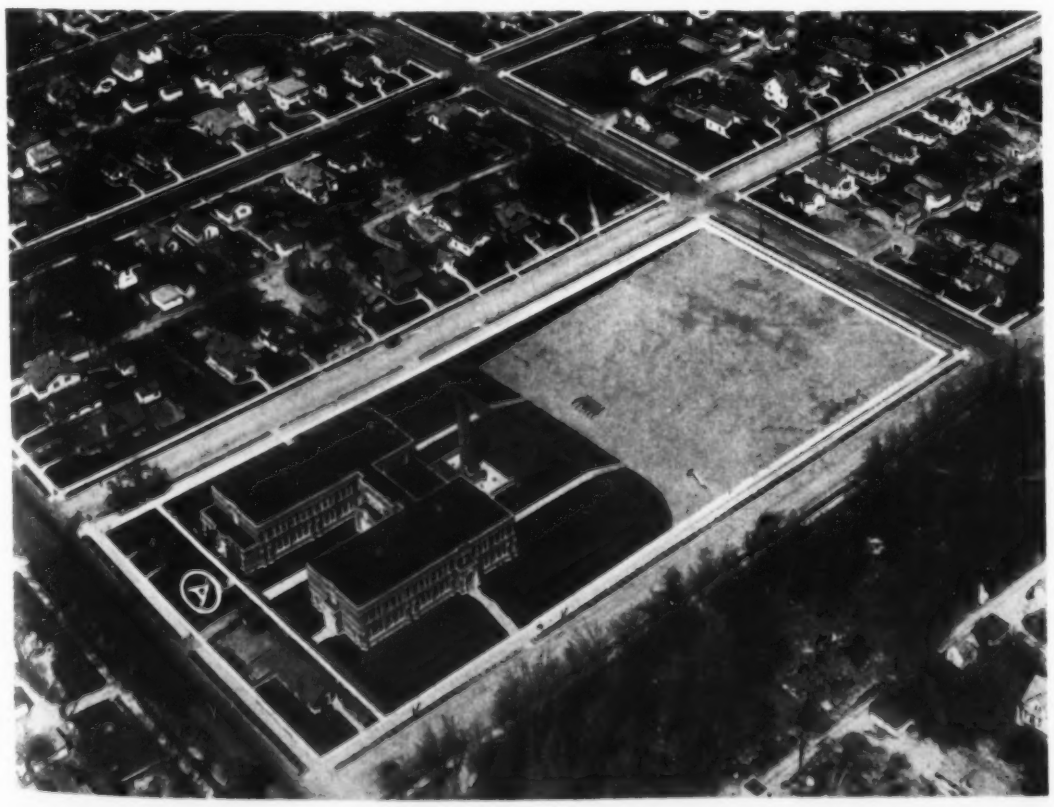
These indices when applied to the respective areas for which they were computed yield the potential ultimate number of school pupils each area will produce for each type of school when the area is completely built up and fully occupied. Application of the indices to the built-up area in any section of the city reveals the number of pupils of each type of school for whom present school facilities should be provided.

[1] *Selecting Sites for School Buildings*, by Engelhardt-Hegel-Womrath, University of Minnesota Press, 1928, Minneapolis, Minnesota.



BRYANT JUNIOR HIGH SCHOOL AND WARRINGTON ELEMENTARY SCHOOL, MINNEAPOLIS, MINNESOTA

An elementary school shares the site of this junior high school. The areas designated "A" should be purchased at the cost of $36,650 in order to round out the playground site. It will be noted that these buildings are in a well-developed area of modest homes.



GROVER CLEVELAND ELEMENTARY SCHOOL, MINNEAPOLIS, MINNESOTA

Two houses and a chicken coop are located immediately in front of this school building, which serves a rapidly developing area of small homes. The cost of the additional land will be $10,700.

Finding Geographic Centers

Knowing the number of pupils of each type of school for whom school facilities have to be provided, the desirable walking distance for the pupils of each type of school, and the desirable optimum capacity of each type of school, the location of all needed sites and the number of schools of each type, and their sizes, became a matter of exercising saneness and good judgment in order to discard as few old buildings and sites as possible and to acquire new sites in the exact geographical center of future school districts. The procedure is sufficiently flexible to provide for the exceptions to the rule.

To illustrate: The index figure is based upon the number of pupils which each unit of 100,000 square feet of area will produce for each type of school when the area is completely built up and fully occupied. If a school district contains 200 units of 100,000 square feet each and the index is 9, then it is reasonable to expect that when the entire area is occupied it will produce 200 times 9, or 1,800 elementary pupils.

Size of schools and walking distances are then correlated. That is, if to produce the optimum school capacity the distance any considerable number of pupils will have to walk exceeds the desirable maximum walking distance, the size of the projected school is cut down to below the optimum capacity. If the number of pupils within the desirable maximum walking distance would provide too few pupils for an economical school unit, the walking distance might be increased somewhat beyond the desirable maximum. Conversely, if the number of pupils within the desirable maximum walking distance exceeds the optimum size of the school, the walking distance is shortened. In any event, by applying the criteria set up in conformity with the educational policy adopted by the school board, the school administrators are able to definitely prognosticate the ultimate number of schools of each type (elementary school, junior high school and senior high school) that will be needed, their location, and sizes, and the ground area to be provided in each site for building and playgrounds.

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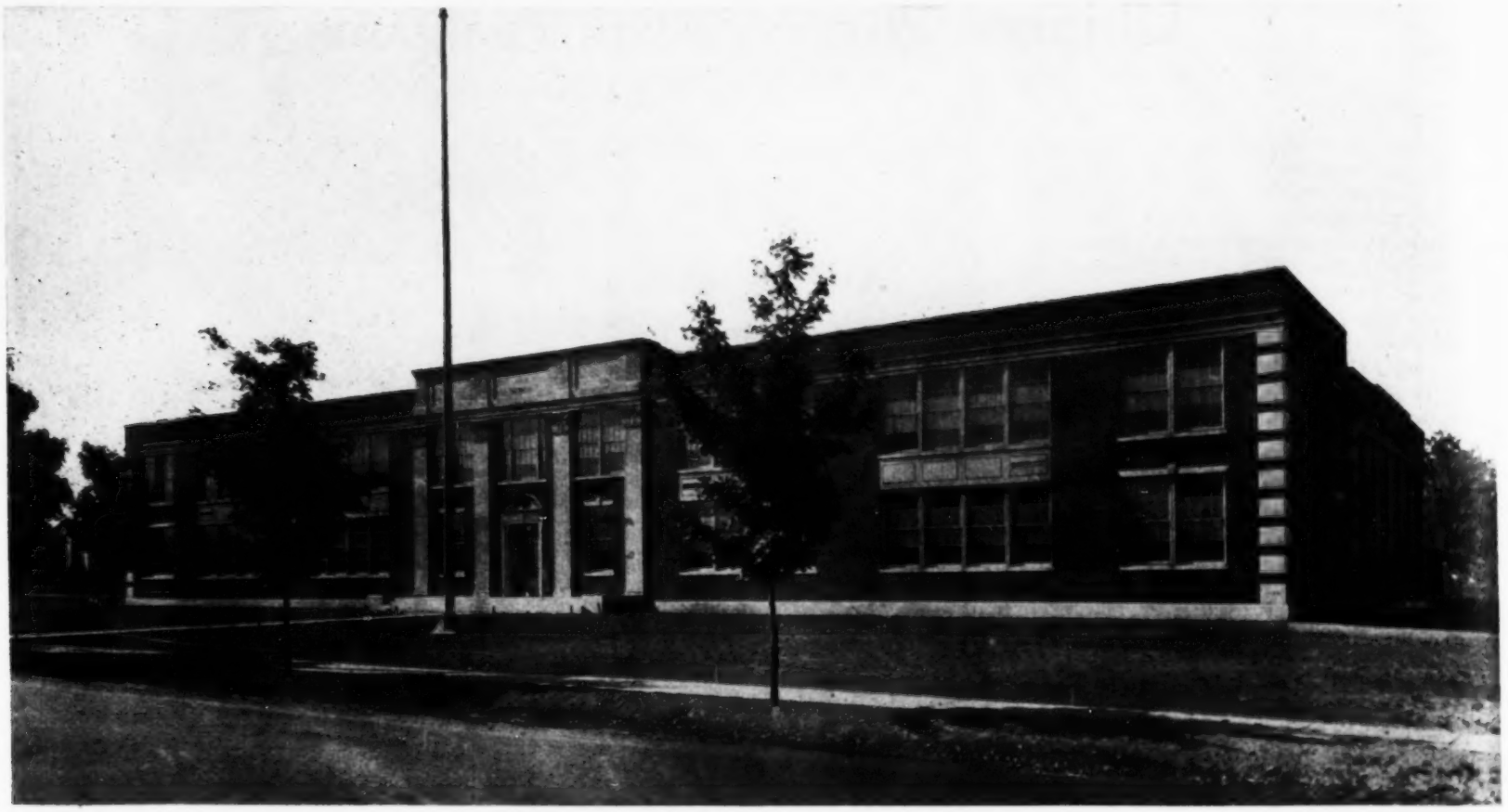

GRADE AND HIGH SCHOOL, CELORON, NEW YORK
Raymond A. Freeburg, Architect, Jamestown, New York

THE CELORON SCHOOL

The grade-and-high-school building at Celoron, N. Y., has been erected on the same site with an old existing building. It is not an addition, but an entirely independent structure. The pupil capacity is 450 pupils, and the auditorium-gymnasium is fitted with 600 seats. The latter room serves also for the adjoining grade-school building.

The building contains on the first floor, three grade classrooms, a large kindergarten, a cooking laboratory, an industrial-arts shop, and a combination gymnasium-auditorium, with boys' and girls' lockers, showers, etc. A combination room for the medical inspector and the teachers, and an office for the principal adjoin the main entrance.

The second floor contains two home classrooms, three recitation rooms, a combination physics and chemistry laboratory, a study hall, a library, a combined typewriting and bookkeeping room, and a grade classroom.

The building contains no basement, except for a small section under the classroom wing.

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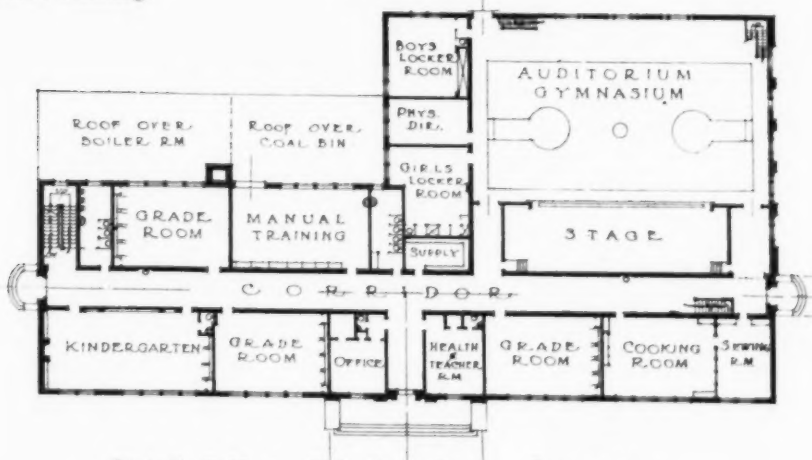

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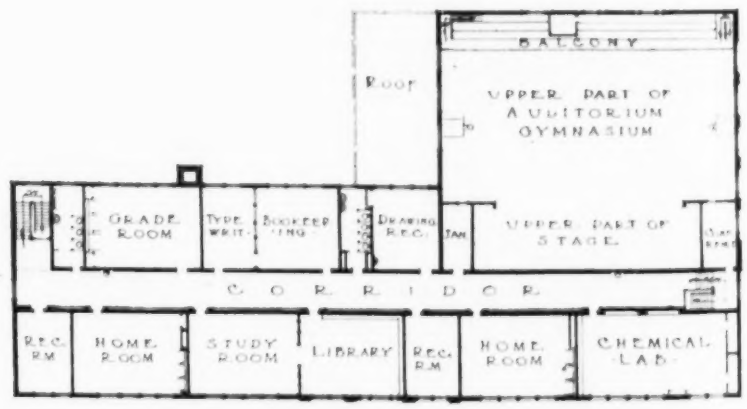

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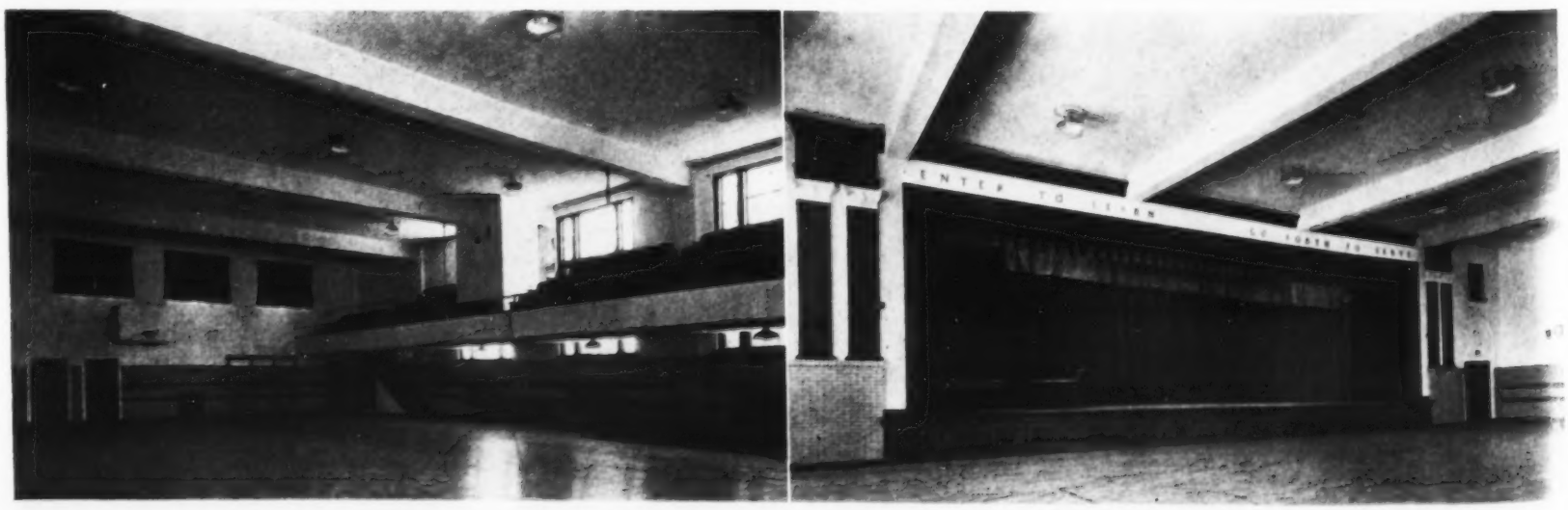


AUDITORIUM-GYMNASIUM, GRADE AND HIGH SCHOOL, CELORON, NEW YORK
Raymond A. Freeburg, Architect, Jamestown, New York

Trends in School Heating and Ventilation Practice

J. M. Robb, Moline, Ill.

Understanding elevates the mind to a viewpoint that gives some adequate idea of the relation of parts to the whole. Like an airplane view of a landscape, the view must be enough elevated to give a clear view of the field to be surveyed, yet not too remote to obscure clear outlines of the related parts.

In heating and ventilation no recognized authority seems to be remote enough to give a clear view of the entire field, yet close enough to identify the separate parts. As a result, the true relation of effects to causes is so little understood, that there is no agreement in conclusion between various observers. Consequently, the channels of authority that must be as clearly defined as highways are, in heating practice, but little more than cattle paths in a wilderness.

What is Heating? What Ventilation?

Now all that ventilation can be, is the transportation of air. When observers agree on this common ground, there will result more general understanding as to how much air to transport, and when to transport it.

All that any heating plant can be, is a device to transport heat. When heating authorities can remove themselves enough out of daily routine, they can readily see the importance of the conditions which only the purchaser can control. From this understanding, organized effort can be made to educate the purchaser up to recognition of his share of responsibilities for successful results. And we can quit misguided attempts to simplify heating, that are of the same nature as proposals to revert modern automobile designs back to the original models.

There are two distinct periods in heating and ventilation practice — the pioneering period and that of refinements and economies. Only the authorities immediately concerned are too close to their operations, and those who benefit the most from the service performed, are too remote to give anyone any adequate idea of the relation of the parts to the whole. Consequently, lack of understanding promotes differences of opinion, that delay the organized effort necessary to spread the load of responsibilities uniformly over all concerned.

When enough time has elapsed to give a true viewpoint of the history of heating, year 1930 will be found to have marked the beginning of a better working understanding of the distinct responsibilities of the designing engineer, the erecting contractor, the manufacturer, and the purchaser for successful heating and ventilation, and the mutual dependence of each party upon all of the others, for success in his own field of endeavor.

The year 1930 marks a definite crystallization of opinion among advanced school administrators, that past ventilation regulations are as inadequate to apply the experience of yesterday to the service of tomorrow, as horse-traffic rules to automobile traffic.

Careful analysis will show that this crystallization has been hastened by several influences which have been apparently working at cross purposes, but which have come definitely closer. Of considerable importance has been a definite statement of principles by a manufacturer whose broad-minded engineering vision has led him to prepare a definite statement of heating and ventilating principles as applied to schools, as far as these are now apparent, with definite working proposals to practically apply these principles in working practice. It will be most illuminating to observe the public reception of these proposals.

The central fan for schoolroom ventilation, is as obsolete as gas illumination. But what is to take its place will be rather definitely decided by the attitude of the mechanical-equipment interests whose business has made present school-ventilation standards. The efforts of the largest blower organizations to market unit ventilators, instead of continuing their opposition to the principles involved, is a very encouraging sign.

If any additional evidence is desired to prove the decease of the central fan for schoolroom ventilation, it may be found in contracts by the Cleveland board of education for unit ventilation, and in the specifications, now being prepared by the Rochester board of education, for unit ventilation, for a two-thousand-pupil junior high school.

Naturally, some school authorities are not concerned of the value of unit ventilation. Niagara Falls, for example, is returning to central fan ventilation after ten years of unit ventilation. Schenectady, N. Y., is using a modified open-window type of ventilation. Such cases are, however, uncommon and illustrate the need of careful engineering applied to all the vital accessory conditions of unit-ventilation practice.

The decision at Decatur, Ill., to abandon all open-window rooms in buildings equipped with unit ventilators is also significant. This decision is based upon three years of study that convince the health authorities that the unit ventilators, properly applied, make every room an open-air room, without the necessity to dress the occupants in Eskimo suits.

Progress in states like Kansas is also significant of a very decided trend. Ten years ago, architects discouraged ventilation provision. Today, the progress made by more than a hundred installations of unit ventilators, has so convinced the school administrators that ventilation is an important influence in their work, that the architects urge familiarity with unit ventilation design, as an inducement to consider their services.

There is a decided trend among the officials who are advanced in their efforts to elevate the standards of school construction in the South, toward a conviction that Southern schoolrooms need the aid of mechanical air supply. As improved construction of schools tends to reduce air flow in response to every out-of-door movement, their recognition of the need for radiator heating advances. With this advance, there is among the most progressive Southern educators a growing recognition that controlled air transportation is vitally important.

Corridor Venting

Corridor venting was made legal in Ohio, by a rule of the Board of Building Standards, passed at a meeting in November, 1930. The Minnesota authorities who have the enforcement of school building and equipment regulations, legalized corridor venting, after exhaustive investigation, in 1928. Wisconsin has permitted corridor venting for school buildings, by special rule, for several years. Steps are now being taken to make corridor venting standard practice, in Wisconsin. Indiana has a corridor-vented school, at Evansville, in the Lincoln school for negroes. Michigan's initial corridor-vented school is at Royal Oak. New York has by special rule, permitted a number of corridor-vented applications to schools, in 1930. Results promise to be as convincing in this state as elsewhere.

The original installation of unit ventilation in Massachusetts, was Stockbridge Hall, College of Agriculture, Amherst. It is corridor vented and the state authorities who have examined results in this building have pronounced them the equal to those delivered by the installations which follow the older regulations.

The first installation of corridor venting in Maine is in a school at Presque Isle, equipped in 1923. Results speak for themselves here as elsewhere.

When unit ventilation devices are viewed properly, as the automobile of schoolroom ventilation, it becomes obvious that vent flues are as superfluous for its functioning as car rails are unnecessary for motor-coach operation. Progress in ventilation is being pushed by progressive school administrators who seek to base their decisions upon principles and a sound knowledge of values, with ever-decreasing dependence upon labels and precedents.

In line with advance in school sanitation, there is a steadily growing appreciation of the necessity for the professional training of the school janitor-engineer. He is now becoming recognized as one of the important factors in modern school education. There is a corresponding recognition of the need for organized training methods to direct his effort properly. In some quarters, there is a decided trend toward the organization of a section in the state department of education, to supervise this training, and to certify accomplishment in it, in the same way that teacher certification has become an accomplished fact.

It begins to be apparent that immaculate cleanliness of surroundings is the result of an attitude of mind. Since order is the first law of God, and dirt is only matter that is out of place, the spotless and immaculate cleanliness of a school building must be made a chorus of harmonious effort, in which every occupant, including the teachers, contributes his share to the harmony. When this advance in viewpoint is attained, the janitor stands out as one of the important instruments in the symphony. Educators now regard the janitor properly as to his relations to their work, with consequent organized effort to advance his training, instead of just letting him flourish like an unhealthy weed.

Along with this advance, there is a growing recognition that teachers must be educated to the functions of heating and ventilation, in the same way that members of the family with one car, must be taught the essentials properly to drive it. Rochester, N. Y., is organizing a training course in heating and ventilation for its public-school teachers, which only indicates the leadership that this very progressive city has so long exerted.

In the division of heat manufacture, the most important event of the year is the publication of Bulletin No. 946, April 30, by the University of the State of New York, *Fuel-Saving Practices and Devices,* by J. H. Hixson. It is the best presentation of fundamentals in fuel saving, so far offered in the field of school administration. It is based upon two years of study of the fuel costs of the schools of the State of New York. The statement is made that at least one fourth the annual fuel cost of four million dollars, is preventable waste. This is a conservative estimate that has been exceeded by every school organization that has had the business sense to select a wise school superintendent, and then clothe him with the powers invariably given to the general manager of a business corporation.

Another very important publication in this field of effort is *The Automatic Stoker for Heating Service, Using Illinois Coal,* by Professor A. C. Willard of the University of Illinois. Every school official who contemplates the use of a stoker should consider very carefully the paragraph on page 35 of this bulletin. The sense of this paragraph is, that the purchase of the stoker may be worse than useless, if proper engineering advice is not bought before buying the stoker.

The enormous growth of the small-stoker use, during the year, makes this device one that will be forced upon the attention of all school administrators, with increasing pressure. An engineering fee of at least $100 is the best insurance of performance that every purchase of a stoker can have. But in this respect, it must be understood that the label "engineer" covers a great variety of products. A mechanical engineer just entering the school field may be a worse affliction than no engineer. The advice to "know your engineer before you hire him," is very sound advice. Its general application would prevent the wasted application of much equipment in school buildings, that is extremely valuable for the purpose for which it was designed, but that is worse than junk in schoolwork.

(Continued on Page 144)

THE AMERICAN
School Board Journal

EDITORS:

WM. GEO. BRUCE WM. C. BRUCE

What About Progress in School Administration?

THE time of year is at hand when the average business concern takes an inventory of its stock on hand, scans the list of bills receivable and payable, ascertains the profits and losses that have resulted, and determines upon future policies and departures.

Likewise are there periods when it may be well to review the progress of the past in the field of school administration and to contemplate policies, plans, and projects for the future. Inventories here, too, have their value, and an estimate of the innovations and changes effected, within the past three decades, can clarify the path for further improvements to be achieved.

If one were to look over the achievements in the field of school administration he would find some remarkable strides in the direction of progress. Let us enumerate some of these achievements.

The more recent developments in school administration note (*a*) greater clarification in the relationships of the factors identified with the same; (*b*) better adjustment of the several units of school government; (*c*) firmer grasp over a greater range of school problems; (*d*) more thorough understanding of the sources of school support; and (*e*) wiser investment of the school dollar.

Notable progress has been made in the administration of state departments of education. They are organized upon a broader and more efficient scope. The expert has entered here, and is rendering a service not dreamed of a quarter of a century ago.

The state departments are equipped with a variety of specialists and experts who advise school authorities on school-building projects, finance and budgetmaking, supervision, etc.

The county unit has come into recognition. It not only replaces the district unit, eliminates the one-room school, dignifies the superintendent into an educational leader, but eliminates many of the political evils which have afflicted the school-administrative labors.

Local school systems, especially as exemplified in the larger centers of population, have been strengthened by recognizing the superintendent as the chief executive, surrounding him with specialists, and by bringing to his aid the services of a research bureau.

The era of surveys, covering school-building programs and the educational status of school systems, has done much to give momentum and direction to city school systems.

On the whole, it may be added that the relations between boards of education and the superintendent have been defined with greater exactitude. Boards of education are more inclined than ever before to hold themselves to questions of policy and to the problems of finance. They are, more than ever, inclined to delegate all matters of a professional character to the experts employed to administer them.

Added to this it may also be said that the average school system is freer today from political influences than ever before. Most boards of education are chosen upon nonpartisan lines, and where the party machinery is employed for the election of such members the question of political control is less of a factor than it was at any time in the history of American school administration.

Decisive Influences in School-Board Elections

THE past year has brought to the surface some profitable lessons in the matter of board-of-education elections. Some of the midwest cities had been afflicted with school administrative bodies which did not measure up to the community ideal. Their problem was how to eliminate undesirable members from the board of education, or rather, how to induce men and women of outstanding character and ability t accept office.

Experience has demonstrated that in the average community th citizens of exceptional character and training are inclined to shrin from the publicity which usually attends a political contest. Persons o that type will not take the initiative in asserting their candidacy fo public office, with the result that the less desirable and more aggressiv win the day.

The remedy must be found in creating a wholesome public sentimen that will discriminate between the desirable and the undesirable candi date for school-board honors. Such public sentiment must find practica expression in an unselfish, high-minded, and tactful citizens' committe whose mission it must be to concern itself not only with choosing th right candidates and promoting their election, but to set ideals and standards which the community may well follow.

Such a committee, properly organized and intelligently led, enjoying the confidence of the thoughtful citizenship and the coöperation of the public press, may render a distinctive service to the community. It may proceed to select candidates for the board of education and urge their recognition by the public without raising the cry of favoritism and ulterior motives.

And this is exactly what happened in several midwest cities within the past year. It may require an unusual situation, and much publicity, to arouse the public mind, but when once aroused, it is bound to assert itself, and to eliminate the evil complained of. The lesson here afforded is that no community need tolerate an incompetent, boisterous, or scandalous board of education. An extraordinary situation, however, must be met through extraordinary methods. Where things are reasonably satisfactory the transition from one school board to another need cause no concern. But when objectionable members of a board of education hang on tenaciously, and defy the public interest, there must be those in the community who will stand up courageously to tell the truth and to point the way to a new order of things.

Dependence and Independence in School Administration

IN recent years much has been said on the subject of independence and solidarity in school administration. Boards of education have chafed under the supervision and control that has been inflicted upon them by city councils, town mayors, tax boards, finance commissions, and the like.

Some of the controversies which have arisen between these agencies and boards of education have found their adjudication in the law courts with the result that the school authorities have been the gainer. Where a city council, for instance, in addition to granting monies for the local school system, attempted to say how that money shall be expended, it has usually met with defeat.

The contention of the courts has been that while a city council may hold the purse strings and can accept or reject a school budget, it cannot consistently or legally determine upon the items enumerated therein. While the municipal machinery may be employed in providing the financial aid which the schools require, the function of a school system comes within the province of the state rather than the municipality.

The dependence of a school system in its relation to the municipality hinges in the last analysis upon what the various local governmental needs may be. In the light of these, coupled with the tax ability of the community, the amounts assigned for school purposes must be determined.

There is, however, one phase of the matter of independence as applied to a school system which deserves consideration. The spirit of self determination and control has here and there found expression in debatable conceptions and departures on the part of school authorities. For instance, shall the libraries be within control of the school board or a separate library board? Shall the health service be directly within the province of the school authorities or in hands of the local health authorities?

The dividing line between dependence and independence is not always made clear in every community. There are boards of education, who with a commendable enterprise proceed to bring all essential phases under their control, but who do not weigh their own scope and function

with sufficient caution and care. Local conditions may afford their own solution, but it remains that some agencies can be served more efficiently under separate control, or other than board-of-education control. Thus a recognition of the value of dependence may be coupled with the advantages of absolute independence.

The Nonpartisan Idea in School Administration

MUCH is being said, from time to time, about politics in the administrative side of the public schools. There is no question that where members of boards of education are chosen upon partisan lines, the school interests are not particularly benefited. Likewise, it requires no discussion to hold that where politicians employ the schools for selfish ends, much harm follows.

In reviewing, however, the conditions in communities where the party machinery is employed to choose the board of education, it is found, too, that the nonpartisan idea is being observed. There are communities where, through a practice of long standing, the candidates for the school board are presented under the designations of the Republican and Democratic parties. And yet the voting public selects its candidates upon the nonpartisan basis, while the school board, after election, ignores all partisan lines in setting upon an organization.

No one would claim that the boards of education of this country are entirely free from political bias, or wholly free from selfish exploitation. But, on the whole, it must be conceded that the schools offer small picking for the professional grafter and exploiter. Frequently the cry of politics is raised when some other term would describe the situation more aptly.

In the nature of things there are many persons, who in the course of events have business or other dealings with a school system. There are those who have sought consideration for some project, scheme, or enterprise. Appointments or contracts are solicited, sometimes with success, sometimes followed by disappointment.

Those who are disappointed in their dealings with a school system are inclined to give voice to their displeasure in vigorous language. The charge of politics is a favorite one. It covers a multitude of sins. And it is employed without specifying just what it means.

Thus, the charge so frequently heard against a board of education, to the effect that it is dominated by politics, usually means nothing more nor less than that someone has met with a disappointment in getting favorable action at the hands of that body.

The Hiring and Firing of School Superintendents

SOME years ago it was ascertained that the official term of the school superintendent in any one community averaged something like three years. We believe that the tenure now is one of longer duration. Whatever may be the exact average as to tenure of service, it is, nevertheless, a fact that, as far as the larger and medium-size cities are concerned, the superintendent is permitted to serve for a reasonable length of time.

If the average tenure is reduced to a matter of three or four years, it is due to two definite causes. One is the migratory tendency of the school executives from the smaller to the larger school districts. Tenure here becomes shortlived, because it is the entrance point of the beginner in the administrative service, and because of the experimental and transientory character of that service.

The second is due to irrational and ill-considered methods employed by school-administrative authorities in the choice and selection of executives. Frequent changes in the superintendency office may imply an inefficient board of education or an incompetent superintendent, or both. Certain it is, that a wise choice of the school executive will wear longer than an unwise one. The school superintendent who has been chosen with discriminate care, properly supported in all desirable and feasible departures and innovations, and given sufficient time to bring them to a proper fruition, will enjoy a reasonable tenure of service. Thus, the board of education that engages in frequent superintendency changes, may well be asked whether such changes are not the logical outcome of unwise selection.

But this question by no means embodies the sole cause for unwarranted changes. A board of education may have lacked in a proper conception of the scope, function, and prerogatives of the superintendent's office. It may have interfered with, or denied proper authority, obstructed or undermined legitimate effort, or resorted to small tactics, making efficient service impossible.

Here it is by no means argued that every school superintendent is competent, or that it is not necessary in instances to make a change, but it does follow that where the hiring and firing of school superintendents becomes an indoor sport, the fault lies with the board of education, and no one else.

When to Hold Board-of-Education Elections

THE general state elections held throughout the country frequently involve the election of members of boards of education as well as school-bond issues. Several newspapers have recently felt called upon to note that the school issues were being submerged in the political contests of the day.

There has been a tendency to eliminate all school questions from the regular election of city, county, and state officials. While most of the school elections are held in the spring of the year, many of them are merged with the regular municipal elections. In such contests the ballot is usually headed by the candidates for the mayoralty, followed by the several city officials, aldermen, and the like. The candidates for the board of education usually constitute the tail end of the ballot.

Experience has taught that school elections should be kept separate from other elections. The choice of a board of education is quite as important as it is to choose an able body of men for the city council. The candidates for public office usually wage a lively campaign and the public interest is centered upon those who make the strongest contest.

The average candidate for board-of-education honors is not so likely to espouse his cause on the political rostrum or in fence posters. He leaves it to the judgment of the constituency to accept or reject him. His standing in the community, his character and fitness for the office, must determine the result.

The public mind can exercise a better discrimination regarding candidates for the board of education when the choice is not submerged in a ballot with a long array of aspirants for public office.

Thus in many communities the election of a board of education, or the matter of a school-bond issue, becomes a separate affair. Where this is done the public mind is focused upon the interests of the school and is more apt to exercise sound judgment in voicing its dictum.

Naming New School Buildings

THE dedicatory ceremonies which attend the opening of new school buildings, as recorded from time to time in the public press, note the increasing tendency to honor persons who have rendered distinctive service to the local school interests.

Thus we find that a splendid new schoolhouse is named in honor of a school superintendent, a principal, or a teacher, who had devoted his or her life to the cause of education. In most instances the honor thus conferred designated persons who have passed away. During the past year the living, too, have been remembered.

The recognition of men and women who have rendered remarkable service to the cause of education is commendable. There are those who traveled in the more modest walks of life and who have never striven for eminence, but have devoted the time and talent in serving the youth of their community.

The exaltation of a local name provides a lesson which is usually more readily grasped by the rising generation with greater interest and appreciation because of its proximity and familiarity. The reasons for the distinction conferred are usually well revealed. The youth profits by the example set by a highly useful career and an exceptional service to mankind.

Ignorance and Knowledge

Ignorance lies at the bottom of all human knowledge, and the deeper we penetrate the nearer we arrive unto it. For what do we truly know, or what can we clearly affirm, of any one of those important things upon which all our reasonings must of necessity be built; time and space, life and death, matter and mind? — *Colton.*

Community Interest in School-Building Projects

Wm. H. Gompert, A. I. A., New York, N. Y.

In the performance of their numerous duties boards of education have no more important service to render their communities than to erect well-constructed and substantial school buildings. For two reasons the utmost care is necessary in every step of a school-building project from its inception to the completion of the structure: First, a schoolhouse renders as important a service to the community as any type of public building, and is subjected to extraordinary wear and tear, and frequently to willful abuse. Second, it must serve a longer life of usefulness than most other public and private structures, and in many instances is required to continue to function after it has become obsolescent.

It may not be amiss to add a third reason for utmost care: The school board is not handling its own funds in erecting a school building, but is acting as the representative of the people and is in duty bound to obtain a dollar's worth for every dollar of tax monies which it spends.

Too great care cannot be taken in employing the best possible architect available. It is a common experience to find at least one architect in among a number who seek a commission, to promise that he will make no charge for the plans if the community should fail to vote the approval of the school project or bond issue. Again, it occurs that an architect claims that he can build more cheaply than the prevailing market cost. It has been the universal experience that both these types are "quacks" and that their services in the end are more costly than those of the man who makes no false representations and promises only to give fair value. The same underlying principles which are applied in choosing a surgeon or physician apply to the employment of an architect. It is not safe to ask an inexperienced young medico to undertake a difficult operation, and one who would offer free treatment would be ruled out without further consideration. In architecture, an individual's experience, training, and personal ability are quite as important as in medicine. The architect chosen for a school should be a well-trained practitioner who has specialized on school buildings and who can demonstrate his experience, and present proof of his business ability and logical judgment.

The Local Architect

If a small community does not chance to have an architect of sufficient talent and experience, but civic pride and sentiment favors a local man, the problem can readily be solved. Under such circumstances, an arrangement can be effected whereby an associate or consulting architect of the type described is retained to collaborate with the local man. Thus, the native son is not slighted, and the community gets the benefit of his knowledge of local conditions and problems, combined with the talents and wide experience of the school-building specialist. When a competent architect has been employed, the first precaution has been taken by the school board to serve the best interest of the community in its building problem.

After the plans and specifications have been completed and are ready for the customary public bidding, precaution should be taken to select contractors of known ability and responsibility who have been doing work of uniformly high quality. If the state school laws do not set up standards for the selection of contractors in such a way as to insure fair and uniform competition, it is quite essential that the board of education promulgate rules and regulations defining the eligibility of the contractors from whom competitive bids will be received.

Various ways may be devised to guard against bids from irresponsible or incompetent persons or corporations. The following test involves principles which every architect consciously or unconsciously uses in determining ability, facilities, and responsibilities of prospective contractors.

Selecting Contractors

First, experience and organization may be rated at 50 possible points. Direct information obtained from careful inquiry should be sought to determine the character and quality of the workmanship and materials furnished on earlier jobs; the expedition with which the work was carried on; and the resourcefulness displayed by the man or organization in meeting the exigencies which inevitably arise in all building operations.

Second, the character and efficiency of the construction equipment owned by the contractor should receive a rating of 30 possible points. The consideration which should govern, in this respect, is whether the contractor has sufficient and proper tools, mechanical apparatus, hoists, scaffolds, planking, trucks, etc., and a material yard or plant where the equipment is available for prompt use at all times.

Third, proper and adequate financial ability and responsibility are at all times necessary to get prompt and efficient results, and for these qualities 20 possible points should be allowed. The consideration in this particular is whether in previous building operations, the contractor conducted the work without financial embarrassment; whether wages and bills for materials were promptly paid; whether requisitions of subcontractors were promptly met when due; whether the contractor can give evidence that he has sufficient resources to complete the work even though the contract is taken under unfavorable or unprofitable conditions due to errors in estimating.

In applying ratings like those suggested, the contractor should receive at least 70 total points to qualify for consideration as a bidder. He should rate at least 10 points of the 20 points allowed for financial ability and responsibility.

After the bids have been opened and the lowest bidder has been determined by a fair tabulation and comparison of the estimates, it is of paramount importance to prepare the contract with every possible care. Many communities have adopted a standard form of contract intended to serve all school-building operations. Usually this form includes all the good ideas which have been picked up through experience, and it is assumed to cover all conditions. In every large building project, however, conditions arise which either have not been properly covered by the contract form or the provisions of the contract have not been made effective because no precedent exists for their application.

A school-building contract usually involves so substantial an expenditure as to warrant the preparation of each contract individually. The writing of a contract should never be treated as a routine matter, but should be made an important duty of a competent architect whose work is checked in detail by an experienced and trained executive school official.

In support of this view, an important case may be cited which occurred in New York City recently, where it was found that there had not been faithful performance of the work of the contract. Upon the outcome of the litigation which followed depended the question of whether or not the contract had been drawn so as to protect the best interests of the city. The particular article upon which the law suit was based is called the "No estoppel clause" and reads as follows:

"Neither the city nor the board, nor any department or officer thereof, shall be precluded or estopped by any return or certificate made or given by the board and superintendent or other officer, agent, or appointee of the city or the board under any provision of this agreement from any time (either before or after the final completion and acceptance of the work and payment therefor pursuant to any such return or certificate) showing the true and correct amount and character of the work done and materials furnished by the contractor or any other person under this agreement or from showing at any time that any such return or certificate is untrue and incorrect or improperly made in any particular, or that the work and materials or any part thereof, do not in fact conform to the specifications; and neither the city nor the board shall be precluded or estopped, notwithstanding any such return or certificate and payment in accordance therewith from demanding and recovering from the contractor such damages as it may sustain by reason of this failure to comply with the specifications."

A Case in Point

The school building referred to had been entirely completed and the work had been passed by inspectors and building superintendents assigned to the supervision of the construction work. The fiscal authorities of the board of education had also passed on the work and the contractor had been paid in full.

Six or eight months after the building was occupied, the writer's suspicion became aroused due to observations he was making of the work which the same contractor was doing in another building. A careful inspection was made which involved the cutting out and uncovering some of the finished work in the building completed and occupied. This inspection revealed work not performed in accordance with the specifications, and evidence was found that a deliberate evasion of the requirements of the contract had been practiced.

While the contractor had been paid, he was certainly not relieved of complete moral responsibility. The school board, however, considered it of great importance that the carefully prepared contract and the specific provision quoted imposed a legal responsibility which could not be evaded. The writer recommended that suit be brought against the contractor to determine the effectiveness of the "No estoppel" clause which does not customarily appear in the standard form of contracts and which previously had never been tested in the courts. In due course and after the usual delays, a trial lasting about one week resulted in a verdict for the city.

The instance just cited illustrates how necessary are the exercise of prudence and experience in the inclusion of clauses in the contracts, which will prove to be a real protection to the board of education.

To sum up briefly, a school board and its school superintendent can safeguard the best interest of the community, in building operations by three main steps:

First, exercise the utmost care in the selection of the architect.

Second, coöperate with the architect in the preliminary studies and the preparation of sketches. Carefully examine the completed plans and specifications to ascertain if they thoroughly include all requirements, meet all needs, and constitute a complete instrument on which a contract can be based.

Third, prepare a contract which is equitable to both the contractor and the board. Exercise care so that the document fits the specific case and contains protective articles which will properly safeguard the community in every respect.

To follow this procedure is the duty of the official executives and, if faithfully adhered to, many of the aggravating situations which occur in building operations will be avoided.

J. D. Robinson Jr. High School,
Toledo, Ohio
Archt: Edwin M. Gee
Contr: The A. Bentley & Sons Co.

Montgomery High School,
Montgomery, Ala.
Archt: Frederick Ausfeld
Contr: Algernon Blair

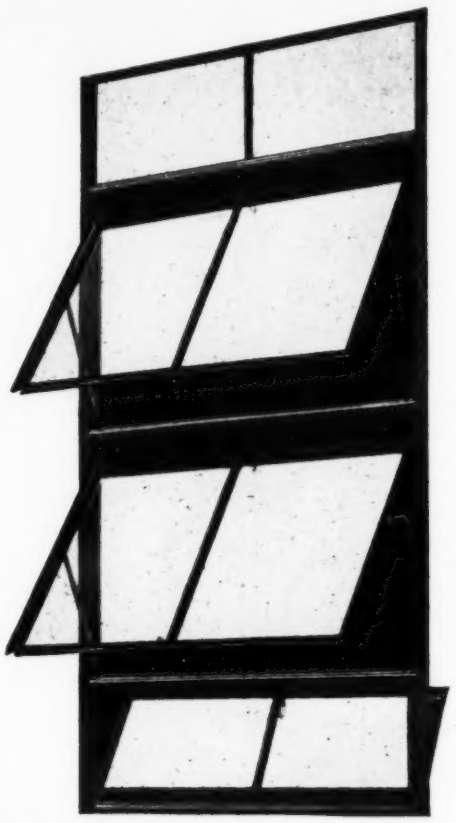
Canajoharie High School,
Canajoharie, N. Y.
Archt: Kinne & Frank, Utica
Contr: Wm. Lyon & Son, Herkimer

Kingsford Park High School,
Oswego, N. Y.
Archt: Gilbert L. Van Auken, Syracuse
Contr: Duplex Construction Co., Inc.

Waterloo High School,
Waterloo, N. Y.
Archt: Carl C. Ade, Rochester
Contr: Anthony Link Sons

Liverpool High School,
Liverpool, N. Y.
Archt: Earl Hallenbeck, Syracuse, N. Y.
Contr: Dawson Brothers, Syracuse, N. Y.

University of Kansas—Biology Bldg.
Lawrence, Kans.
Archt: Chas. D. Cuthbert, Topeka, Kans.
Contr: P. D. Olmstead Constr.,
Lawrence, Kans.



This WINDOW *will pass your examination*

1. *Question:* Will it harmonize with the architectural style and beauty of our new building?

   Answer: The Fenestra Fenmark Window is pleasingly designed for simplicity, continuity and restraint to harmonize with all types of school buildings. Its solid bronze hardware is most attractively designed.

2. *Question:* Will it provide adequate ventilation yet protect the health of our teachers and pupils?

   Answer: Fenestra's projecting ventilators are arranged to provide practically any amount of ventilation desired up to 100%. Upper ventilators slide down and tilt out at the bottom. Sill ventilator slides up from the bottom and tilts in at the top. No separate windguards necessary. Ventilation provided without direct draft.

3. *Question:* Will this window provide adequate light for the schoolroom and yet allow sufficient space for blackboards?

   Answer: Fenestra's solid rolled steel construction permits the use of narrower sections, thus admitting more light through any given sized opening. More wall space is available for blackboards.

4. *Question:* Will this window withstand the vigorous use to which school windows are usually subjected?

   Answer: Built of heavy, solid, rolled steel sections, these windows are rugged, durable, permanent. Hardware and fittings built to withstand rough usage.

5. *Question:* How do they insure protection against winter weather — or against the sudden storms of summer?

   Answer: All Fenestra ventilators are designed with a double internal baffle and a wide, flat overlap against the frame section, insuring weathering as tight as a wood window weather-stripped. Ventilators operate easily and quickly — never stick or warp.

6. *Question:* Can they be washed economically?

   Answer: Every square foot of glass area can be easily and quickly washed from the inside, by low-cost labor.

7. *Question:* How does the cost compare with other types of windows?

   Answer: Fenestra Windows, installed, cost little more than ordinary windows, while upkeep costs are reduced to a minimum.

Fenestra demonstrations, made without obligation for school architects, school board members and school officials, will show that the above answers are correct in every detail. Interesting literature will be sent on request. Phone the local Fenestra office.

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Factories: Detroit, Michigan, and Oakland, Calif.

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Permanently Non-Slip

An entrance vestibule floor that is non-slip even on rainy or snowy days—

Alundum Ceramic Mosaic Tile (white granite field, brown border)—

Stair treads that are permanently non-slip and wear-resisting against hustling, scuffing children's feet—

Alundum Stair Tile (brown).

NORTON COMPANY
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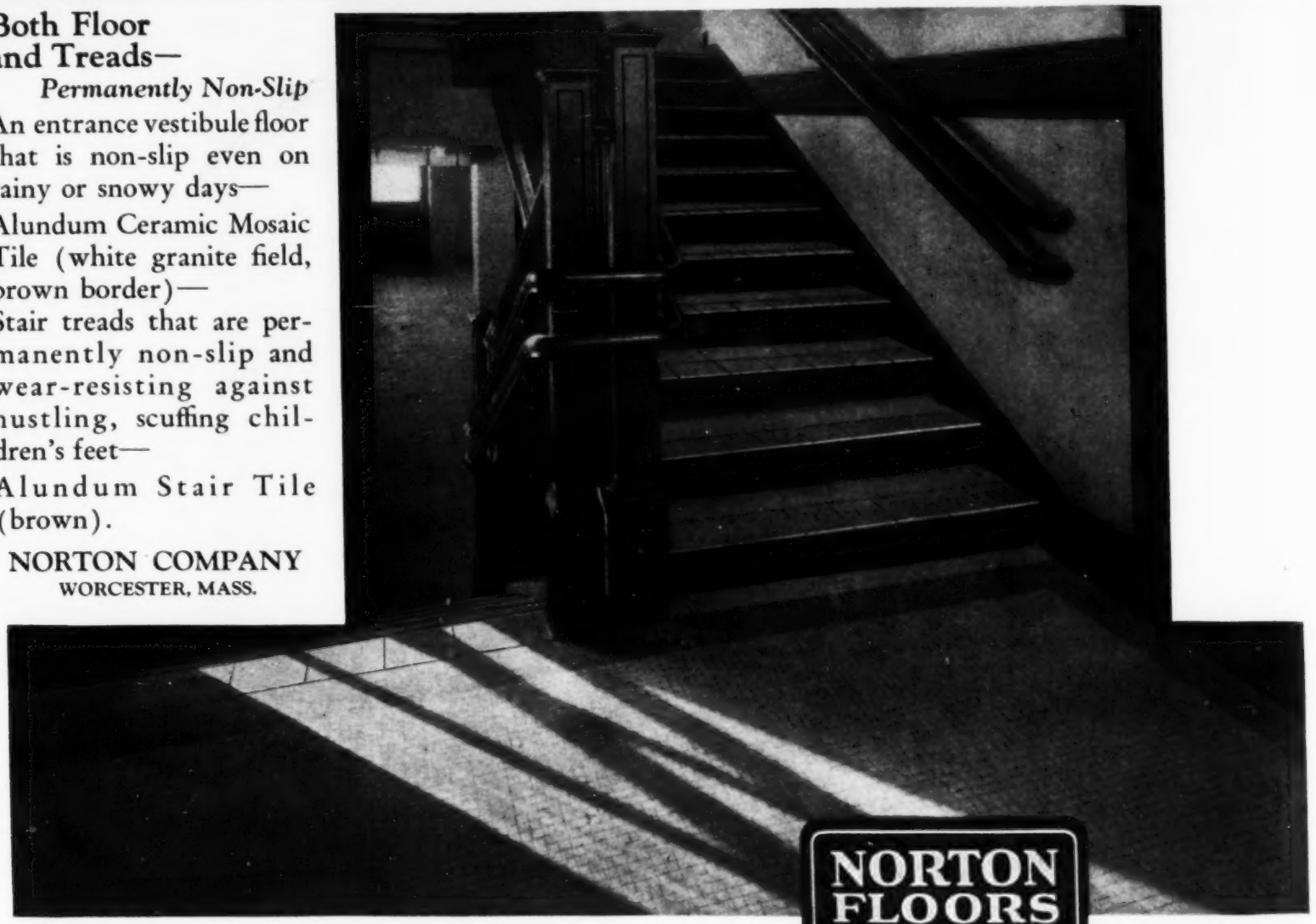

GRADE SCHOOL, GLASTONBURY, CONN.
Architects: Sellew & Towner, Middletown, Conn.

T-251

School-Building Programs in 1930-31

Alabama

North Little Rock. In 1930, a total of $100,000 was expended on buildings and grounds. No program for 1931. W. E. Phipps, superintendent of schools.

California

Berkeley. The school board is completing the the erection of two schools. The addition to the Longfellow School will be completed at a cost of $115,000. A gymnasium is being erected for the Burbank Junior High School, at a cost of $5,000. Program for 1931 held up pending the submission of a school-bond issue. L. W. Smith, superintendent of schools.

Burbank. The school board contemplates spending a balance of $29,000 of a previous bond issue for high-school building work in 1931–32. F. A. Henderson, superintendent of schools.

Beverly Hills. No building program for the present. Contemplate a bond issue of $250,000 to $300,000 in 1931. E. J. Hummel, superintendent of schools.

Oakland. The school board has adopted a building program for 1931, which will include present construction work involving a cost of $120,000, and contemplated projects to cost $425,000. No bond issues proposed for 1931. D. B. Rice, business manager.

Pasadena. During the year 1930–31, the school board proposes the erection of an astronomy building for the junior high school at a cost of $22,000; the erection of the Eliot Junior High School at a cost of $250,000; an auditorium for the Muir Technical High School at a cost of $166,000; and an addition to the Hamilton School at a cost of $90,000. S. C. Joyner, business manager.

San Bernardino. The building program of the school board for 1931 will include a junior high school to cost approximately $70,000. No bond issue proposed. L. E. Adams, superintendent of schools.

Los Angeles. The school board has under construction four elementary-school units, and two additions to schools, to cost approximately $453,000; three physical-education units for junior high schools, to cost $150,000; three additions, to cost $337,000; a senior high school, to cost $412,000, and rebuilding of another high school, at a cost of $34,000. During 1931, the school board plans the erection of five elementary schools, and additions to schools, at a total cost of $731,000; the building of a high-school plant, at a cost of $400,000 and improvements to two high schools, at a cost of $254,000. No bond issue is planned.

San Francisco. The school board contemplates the erection of the Lick Junior High School at a cost of $600,000; the erection of the Sullivan School at a cost of $135,000; an addition to the Girls' High School at a cost of $200,000; and an addition to the Longfellow School at a cost of $125,000. J. M. Gwinn, superintendent of schools.

San Jose. The school board has awarded the contract for the erection of a 12-room elementary school, to be completed at a cost of $60,000. Contracts have also been let for the first unit of the junior high school to cost $325,000, the first unit of another junior high school to cost $230,000, and the completion of an existing junior high school at a cost of $265,000. W. L. Bachrodt, superintendent of schools.

Colorado

Denver. The school board has completed its building program for 1930, part of which will extend into 1931. Among these projects are an addition to the Whittier School to cost $65,000, an elementary school to cost $242,000, and a junior high school to cost $492,000. The next building project to be started in 1931 will be an elementary school to cost $225,000. H. W. Anderson, deputy superintendent of schools.

Connecticut

Bridgeport. The mayor has recommended an appropriation of $1,000,000 for additional school-building facilities during the year 1931. Worcester Warren, superintendent of schools.

New Britain. The school board will erect one new school building in 1931, to cost approximately $200,000. A bond issue will be voted for that purpose. S. H. Holmes, superintendent of schools.

Stamford. The school board will ask for an appropriation for the erection of a school building and for the purchase of a site for a junior high school. At the present time the board is completing an elementary school, at a cost of $237,500 for site and equipment. J. A. Ewart, superintendent of schools.

Stratford. During the year 1930–31, the school board will have three school buildings under construction. These will include a ten-room elementary school, to cost $100,000, an addition to the junior high school, to cost $200,000, and an addition to an elementary school, to cost $40,000. Bond issues for each of these projects will be voted in the near future. E. W. Ireland, superintendent of schools.

Middletown. The school board has a junior-senior high school under construction to cost approximately $250,000. An addition to the high school will be erected at a cost of $190,000, and an addition to a small primary school, at a cost of $40,000. F. W. Shearer, superintendent of schools.

West Hartford. During the year 1930–31, the school board plans the completion of the Sedgwick Junior High and Elementary School, at a cost of $545,000. Three other building projects, including an elementary school, and two additions, have been practically completed, at a total cost of $425,000. L. H. Bugbee, superintendent of schools.

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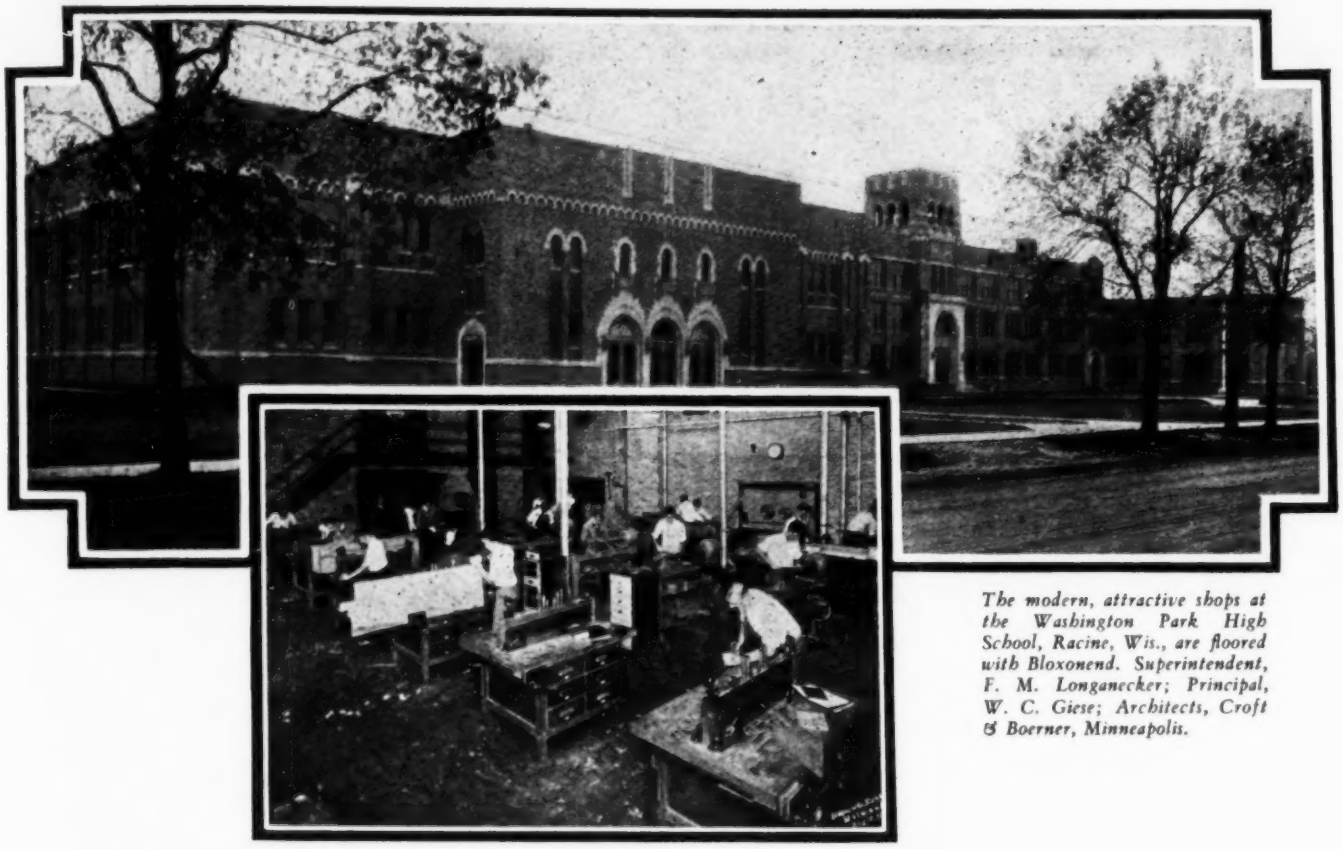

The modern, attractive shops at the Washington Park High School, Racine, Wis., are floored with Bloxonend. Superintendent, F. M. Longanecker; Principal, W. C. Giese; Architects, Croft & Boerner, Minneapolis.

"BLOX-ON-END *is the* IDEAL *flooring for school shops*"

. . . This is the opinion of school architects and school officials who have compared the performance of Bloxonend with that of other floors used in this service.

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BLOX-ON-END's record of past performance in gymnasiums and shops is convincing proof of its superiority. Let us send you complete information.

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BLOX-ON-END FLOORING

Bloxonend is made of Southern Pine with the tough end grain up. It comes in 8 ft. lengths with the blocks dovetailed endwise onto baseboards

Lay's Smooth
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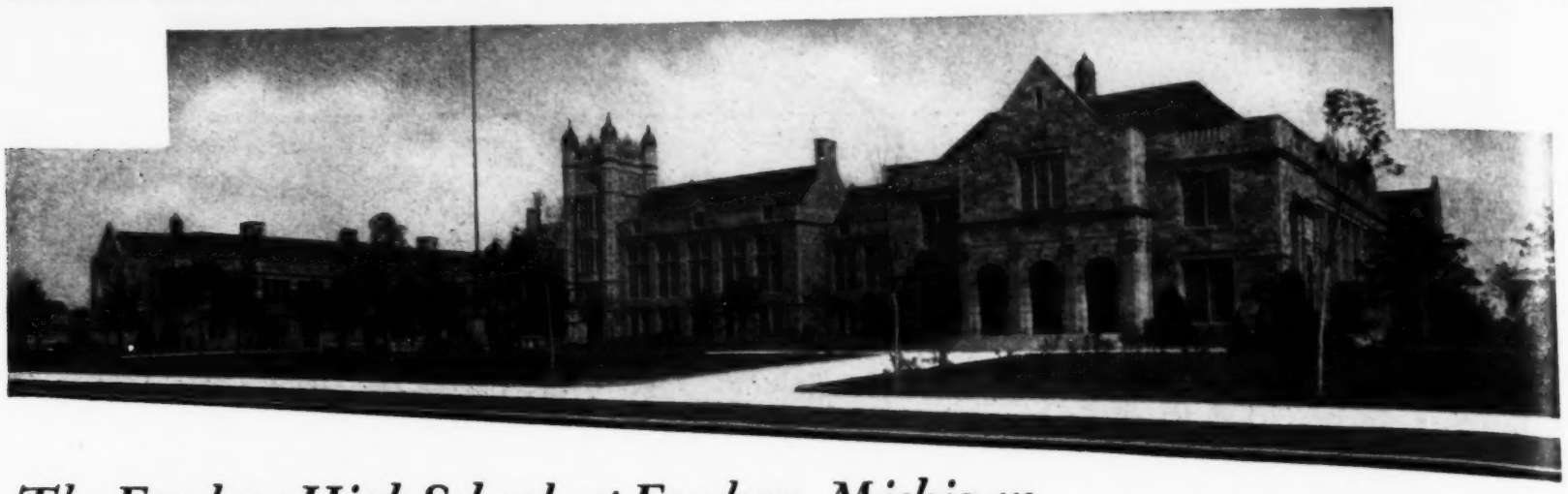


The Fordson High School, at Fordson, Michigan, Would Naturally Have Finest Equipment— Hartshorn Joanna Cloth Window Shades

SINCE modern education teaches that it is true economy to buy the best, the Fordson High School, at Fordson, Michigan, makes this rule practical with time-tested window shade equipment... The Joanna Cloth of the shades, and the never-failing shade rollers were made by Stewart Hartshorn —a name that is synonymous with enduring satisfaction.

STEWART HARTSHORN COMPANY, 250 Fifth Avenue, New York City

Hartshorn Est. 1860

SHADE ROLLERS *and* WINDOW SHADE CLOTH

(Continued from Page 88)

Delaware

Wilmington. The school board has adopted a building program for 1931 involving a cost of $600,000. The program will include five elementary schools, one junior high school, and two senior high schools. At the present time, the board is completing one colored elementary school to cost $175,000, and one white building to cost $500,000. S. M. Stouffer, superintendent of schools.

Florida

Tampa. The voters have been asked to approve a bond issue of $45,000 for the erection of a school in Dover. W. D. F. Snipes, superintendent.

Georgia

Macon. The school board has completed a senior high school, at a cost of $225,000. Construction work has started on an open-air school building, to be erected at a cost of $3,000. W. P. Jones, superintendent.

Illinois

Chicago. The school board has in hand recommendations for 22 new schools, to be erected during 1931, at a cost of $28,400,000. At the present time, the board has 12 building projects under construction, for which an appropriation of $17,435,000 has been made. T. J. Higgins, assistant director building survey.

East St. Louis. During the past eighteen months, the board has completed the erection of one junior high school and three elementary schools. At present, the board has one junior high school under construction. D. W. Potts, superintendent of schools.

Forest Park. The school board has adopted a building program calling for the erection of an addition to the Field-Stevenson School, at a cost of approximately $120,000. W. S. Dimmitt, superintendent of schools.

Joliet. The school board is completing plans for an addition to one of the schools, at a cost of $50,000. At present, the board is completing an addition to the Marshall School, at a cost of $50,000. An addition to the township high school, costing $450,000, is in process of completion. H. A. Perrin, superintendent of schools.

Oak Park. The school board has awarded a contract for an addition to the Beye School, to cost $130,151. At present, the board is completing an addition to the Whittier School, at a cost of approximately $211,012. W. J. Hamilton, superintendent of schools.

Peoria. The school board has adopted a ten-year building program which provides for the erection of an elementary school to cost $228,000, three junior high schools to cost $500,000 each, an addition to the Reservoir Heights School to cost $28,000, and the purchase of a central athletic field, with stadium and fieldhouse E. C. Fisher, superintendent of schools.

Quincy. The school board will shortly ask for bids for the construction of a high school, to cost approximately $1,300,000. Bonds in the amount of $500,000 have been voted toward the cost of the building. J. H. Steiner, superintendent of schools.

Evanston. The school board of Dist. No. 75 contemplates the building of three additions during 1931. The amount of the expenditure will be $250,000. J. R. Skiles, superintendent of schools.

Champaign. The school board contemplates the erection of an addition to the Howard School, at a cost of approximately $65,000. At the present time, a 4-room addition is being completed at the Columbia School, at a cost of $65,000. V. L. Nickell superintendent of schools.

Indiana

East Chicago. The school board has under construction at the present time an annex to the Harrison School, at a cost of $120,000. A contract has been awarded for the erection of a new school, at a cost of $100,000. Plans are being completed for an industrial unit for the Washington School, to be erected at a cost of $350,000. J. G. Rossman, superintendent of schools.

Fort Wayne. The school board has awarded contracts for the erection of a thirteen-room grade school and a gymnasium-auditorium, at a cost of $124,000. An additional grade school will be erected late in the summer of 1931, at an estimated cost of $85,000. L. C. Ward, superintendent of schools.

Richmond. The school board has called for bids on the construction of an elementary school to cost $90,000, an addition to the Test Junior High School to cost $17,000, and additions to two elementary schools to cost $118,000. Bonds in the amount of $180,000 will be voted in the near future. W. G. Bate, superintendent of schools.

South Bend. The school board has under construction two elementary schools. The total cost of these buildings will be $700,000. G. B. Sargent, assistant superintendent of schools.

Iowa

Fort Dodge. The school board has called for bids for the erection of a junior high school, to be erected at a cost of $225,000. The building is to be completed by September, 1931. An addition will be built to one of the grade schools, at a cost of $25,000. K. D. Miller, superintendent of schools.

Waterloo. The westside school board has begun the construction of an elementary school, which is to be completed at a cost of $177,740. Bonds in the amount of $200,000 have been offered for sale. C. A. Kittrell, superintendent of schools.

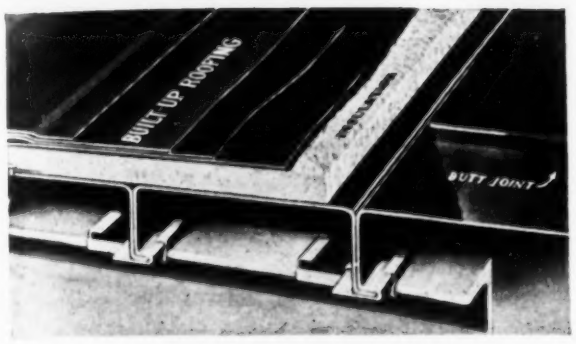
Decorah. The voters recently approved a bond issue of $130,000 for building and equipping an addition to the present high school. C. C. Gamertsfelder, superintendent of schools.

Kansas

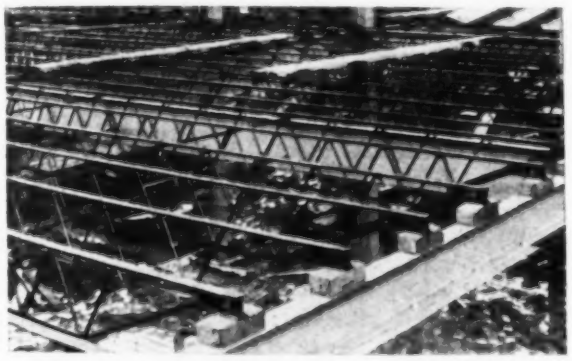
Coffeyville. The school board has under construction a senior high school, to be completed at a cost of $450,000. A. I. Decker, superintendent of schools.

(Continued on Page 92)

Health and Safety in Modern Schools



Steeldeck Roofs for fireproof roofs, quickly erected at economical cost.



Steel Joists, economical fireproof construction for floors, erected without forms.

Metal Lath for plastered walls and ceilings. Stops fires and prevents cracks.

Ample daylighting and proper ventilation promote the health of school children. Diffused sunlight without glare and natural ventilation without draughts are obtained through Truscon Donovan Awning Type Windows.

Protection against the fire menace must be provided in modern schools. Fireproof construction is assured with Truscon Steel Building Products which include steel joists and reinforced concrete for floors, Steeldecks for roofs, metal lath for plastered walls and ceilings, metal door frame and trim for doors, and steel doors for furnace rooms, service entrances, etc.

The high quality of Truscon Products insures permanence and satisfaction. Their many distinctive features result in better construction at economical cost. The complete Truscon line includes products to meet every building condition.

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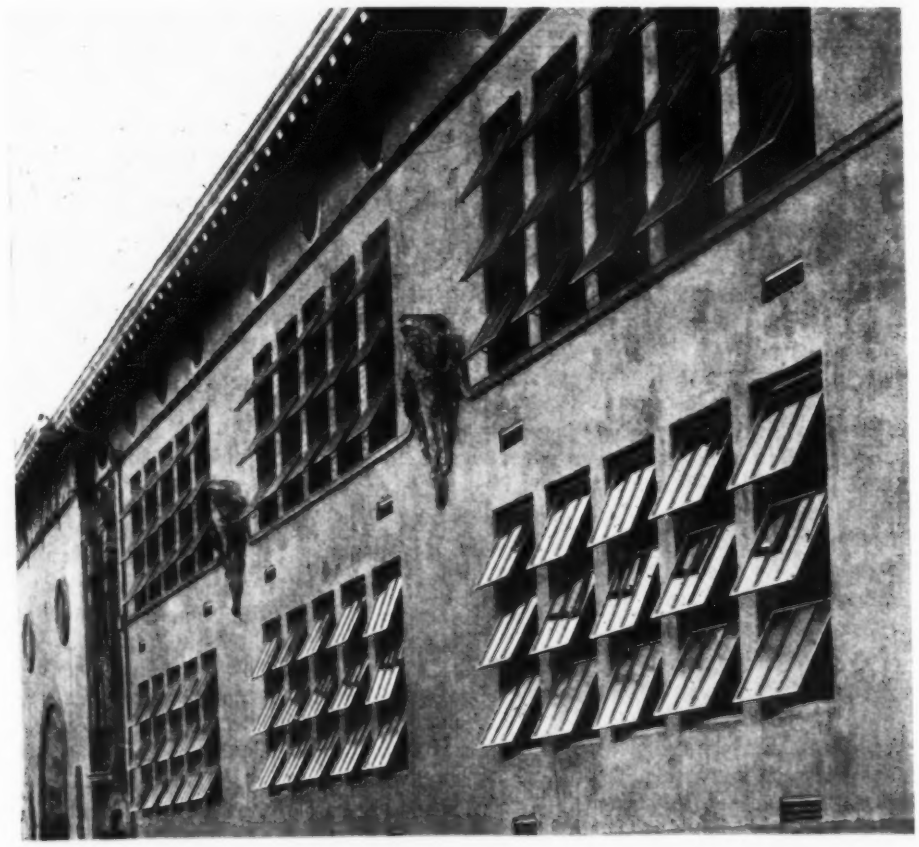

Truscon Donovan Awning Type Steel Windows. Movement of lower sash operates upper sash. All sash may be open, or upper or lower sash closed. Shades on sash act as awnings.

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The uses for Circle A Folding Partitions are virtually limitless. There are two styles, and four surface treatments. Wherever effective subdivision is desired, there is a Circle A Folding Partition to completely suit the job.

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CIRCLE A FOLDING PARTITIONS

··Sound Insulated··

(Continued from Page 90)

Arkansas City. The school board has called for bids for the erection of three elementary schools, to cost $45,000, $50,000, and $10,000 respectively. No bond issue is contemplated. C. E. St. John, superintendent of schools.

Kentucky

Ashland. The school board has begun the preparation of plans for a new junior high school, to cost about $225,000. The building will be completed in January, 1932. J. D. Falls, superintendent of schools.

Owensboro. The school board has adopted a building program for 1931, calling for the erection of a grade school to cost $90,000, an annex to a grade school to cost $50,000, and an annex to the colored high school to cost $30,000. J. L. Foust, superintendent of schools.

Maine

Lewiston. The school board has awarded the contract for the construction of a senior high school, to cost $442,000. C. W. Bickford, superintendent of schools.

Massachusetts

Everett. Plans are being completed for the erection of a proposed junior high school in 1931. F. Whitney, superintendent of schools.

Holyoke. The school board is planning the erection of a large junior-senior high school in 1931, to cost about $1,100,000. At the present time, the board is completing the Lawrence grade school at a cost of $400,000, and the Vocational and Continuation School at a cost of $200,000. W. P. Peck, superintendent of schools.

Lynn. The school board has under construction the new Eastern High School, to be completed at a cost of approximately $1,500,000. E. Stephens, superintendent of schools.

Marlborough. The school board is erecting a 16-room elementary school, at a cost of $150,000. Another building of similar size will be erected in 1931, at a cost of $150,000. E. P. Carr, superintendent of schools.

New Bedford. During the year 1931, the school board will complete plans for an addition to the senior high school, to cost from $600,000 to $1,000,000. At present, the board is completing the erection of a girls' vocational school, at a cost of $250,000. A. P. Keith, superintendent of schools.

Newton. The school board is planning the erection of an addition to one of the grammar schools during 1931. A junior high school, to cost $800,000, is in process of construction at the present time. U. G. Wheeler, superintendent of schools.

Norwood. The school board is planning an addition to the senior high school, to cost $45,000. L. W. Grant, superintendent of schools.

Pittsfield. The school board contemplates the erection of a high school, to cost $1,500,000. J. F. Gannon, superintendent of schools.

Taunton. The school board has begun the erection of a large addition to the high school, work upon which will extend into the middle of 1931. The building will be erected at a cost of $350,000. W. A. Mowry, superintendent of schools.

Westfield. The school board has begun work on a boys' trade school, which is to be completed next year, at a cost of $142,000. C. D. Stiles, superintendent of schools.

Worcester. The school board has adopted a building program for 1931, which calls for the erection of an eight-room grammar school at a cost of $125,000, a junior high school at a cost of $800,000, an addition to the South High School at a cost of $500,000, and an addition to the Andover Street School at a cost of $50,000. The addition to the high school will be financed from the proceeds of a bond issue, while the other three buildings will be taken care of in the annual budget. W. S. Young, superintendent of schools.

Weymouth. The school board is completing plans for the erection of two six-room elementary schools during the year 1931. The buildings will be erected at a cost of $75,000 each. P. T. Pearson, superintendent of schools.

Waltham. The school board is completing plans for a senior high school, to be erected during 1931. The amount of the bond issue will possibly exceed $500,000. W. H. Slayton, superintendent of schools.

Michigan

Battle Creek. The school board has an elementary school under construction at the present time, to cost approximately $145,000. No bond issue is proposed for 1931. F. M. Hazel, superintendent of schools.

Hamtramck. The school board has one building under construction at the present time, to cost $900,000. No additional projects are planned for 1931. M. R. Keyworth, superintendent of schools.

North Muskegon. The school board has under construction the McKee School, which provides accommodations for pupils of the elementary and junior-high-school grades. J. E. Pease, superintendent of schools.

St. Ignace. The voters recently approved bonds in the amount of $65,000 for the erection of the LaSalle School. W. A. Ellsworth, superintendent of schools.

Benton Harbor. The school board has under construction a junior-high-school building, to cost approximately $200,000. S. C. Mitchell, superintendent of schools.

Minnesota

Minneapolis. The school board has adopted a building program, calling for the erection of three junior high schools, at a cost of $1,525,000, and a girls' vocational school at a cost of $800,000. At the present time, the board is completing a junior high school at a cost of $220,000, an elementary school at a cost of $227,000, and a school gymnasium at a cost of $50,000. C. R. Reed, superintendent of schools.

Rochester. The local chamber of commerce is supporting a movement for a combined school and

(Continued on Page 95)

STROWGER P-A-X

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WHEREVER Strowger P-A-X has been adopted for school use it has been instantly recognized as an ESSENTIAL communication service, because it fits in with actual school operating conditions. It has neither the limited capacity and limited usefulness of push-button systems, nor the slowness, inaccuracy or high operating expense of systems requiring the constant attention of a switchboard attendant.

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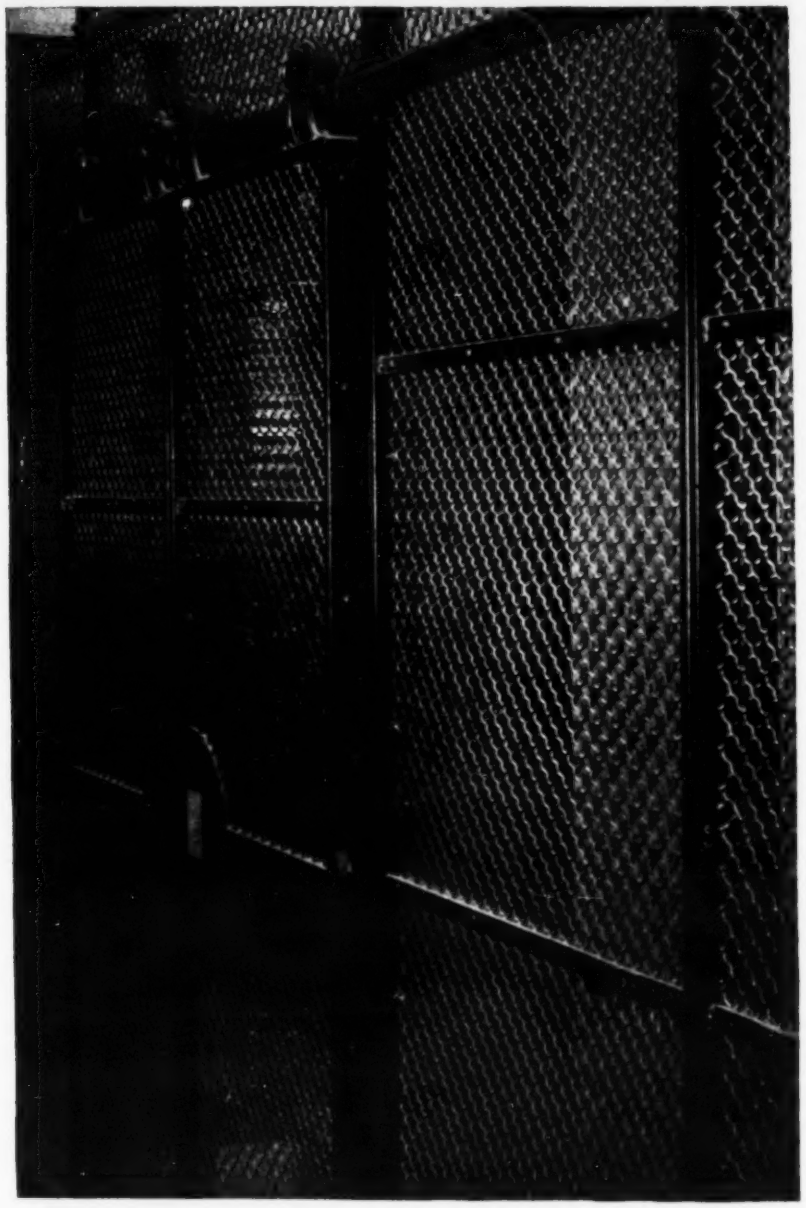

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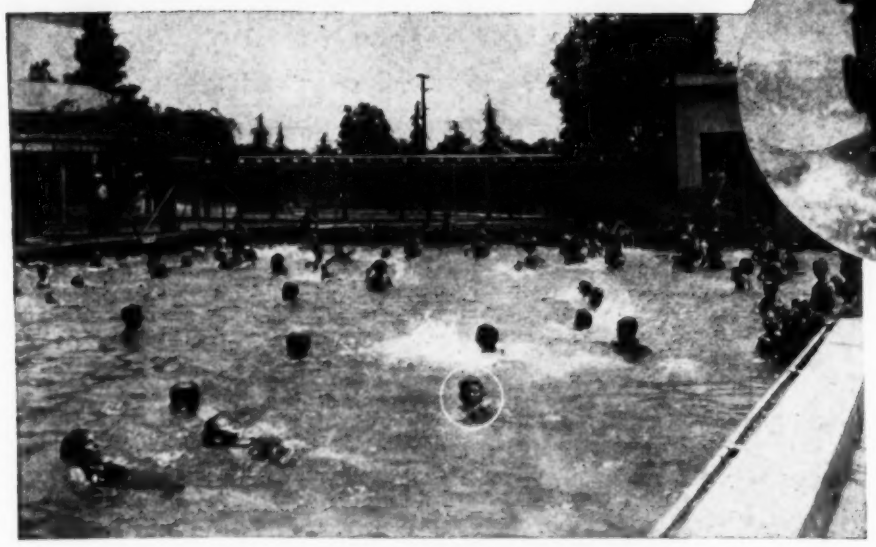

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SP 10A

(Continued from Page 92)

municipal auditorium, to seat 3,000 persons and to cost $250,000. G. H. Sanberg, superintendent of schools.

Windom. Bonds in the amount of $125,000 have been voted for the erection of a high school.

Winona. The school board is completing an elementary school, at a cost of approximately $170,000. Plans have been made for the erection of a similar school, at a cost of approximately $230,000. No bonds were voted for these buildings but they are being paid for out of a special sinking fund which accumulates year by year. A third building project is contemplated within a period of two years. D. F. Dickerson, superintendent of schools.

Mississippi

Jackson. The school board will expend approximately $300,000 for the erection of additional elementary schools during the year 1931. E. L. Bailey, superintendent of schools.

Missouri

Springfield. The school board will have completed an extensive school-building program in September, 1931. The program covers a three-year period and involves an expenditure of nearly $2,000,000. Six additions and two one-story buildings have been completed, while two large elementary schools will be completed by February 1. Other structures to be completed during the next year are three elementary schools, a senior-high-school gymnasium, and a combined negro high and elementary school. H. P. Study, superintendent of schools.

Joplin. During the year 1931, the school board will erect a 20-room junior high school, with shops and auditorium, at a cost of $250,000. At the present time, the board is completing three building projects — the South Junior High School auditorium-gymnasium at a cost of $69,207; the Emerson School building at a cost of $91,586; and the McKinley elementary-junior high school auditorium at a cost of $26,181. These buildings complete a building program involving an expenditure of $1,400,000. E. A. Elliott, superintendent of schools.

St. Louis. The school board has under construction at the present time eight building projects, including two elementary schools, a vocational school, new shops, additions to two elementary schools, and power and boiler houses. No contracts have been let for new buildings in 1931. G. R. Johnson, director, division of measurements.

St. Joseph. The school board is completing the new Webster and Edison schools, at a cost of $329,911. Plans have been made for the completion of the senior high school, and two elementary schools in September, 1931, at a cost of $600,000, $128,000 and $160,000 respectively. F. H. Barbee, superintendent of schools.

Nebraska

Grand Island. During the year 1931, the school board contemplates the erection of an addition to one of the elementary schools, at a cost of approximately $31,000. The board will finance its building activities by means of current tax levies. C. R. Gates, superintendent of schools.

New Jersey

Bloomfield. Contract will be let shortly for the erection of an elementary school, to be completed at a cost of $350,000. E. S. Stover, superintendent of schools.

Englewood. Plans have been completed for the erection of a junior-senior high school, at a cost of approximately $1,000,000. It is expected that the city council will shortly authorize the funds for this building. Winton J. White, superintendent of schools.

Jersey City. During 1931 the school board will begin the erection of an elementary school and a junior high school in the Hudson City section, and in 1932 a senior high school and grammar school will be erected in the Greenville section. The A. Harry Moore School for Crippled Children is at present under construction. James A. Nugent, superintendent of schools.

Paterson. The school board is completing plans for a 26-room elementary school to be begun in 1931 and to be ready for occupancy in September, 1932. Cost, $517,000. A similar building now under construction, will be completed in September, 1931. John R. Wilson, superintendent of schools.

Perth Amboy. The school board has adopted a program, calling for the erection of an addition to the senior high school, a gymnasium, a cafeteria, and four shops. The cost of the addition will be $235,000.

Teaneck. No building construction under way at present. Two building projects are contemplated for the year 1931. One is a junior-high-school addition to cost $635,000, and the other is an elementary school to cost $230,000. L. N. Neulen, supervising principal.

Perth Amboy. The school board has completed plans for alterations and additions to the high school, costing approximately $235,000. W. C. McGinnis, superintendent of schools.

New York

Niagara Falls. The school board is completing two junior high schools, at a cost of $656,674 and $722,060 respectively. An additional bond issue of $200,000 will be sold in 1931 to cover the cost of equipment for these buildings. J. F. Taylor, superintendent of schools.

Rochester. The board of education has asked the city council for an appropriation of $3,520,000, to cover the cost of buildings, sites, and equipment for the year 1931. Five buildings are contemplated for erection during the next year, at a total cost of $3,120,000. Two buildings are under construction at the present time, at a total cost of $1,353,510. F. R. Scherer, deputy superintendent of school buildings.

Waterbury. During the next year an addition to the Boon Street Grammar School will be erected, at a cost of $93,000. No additional bond issue is

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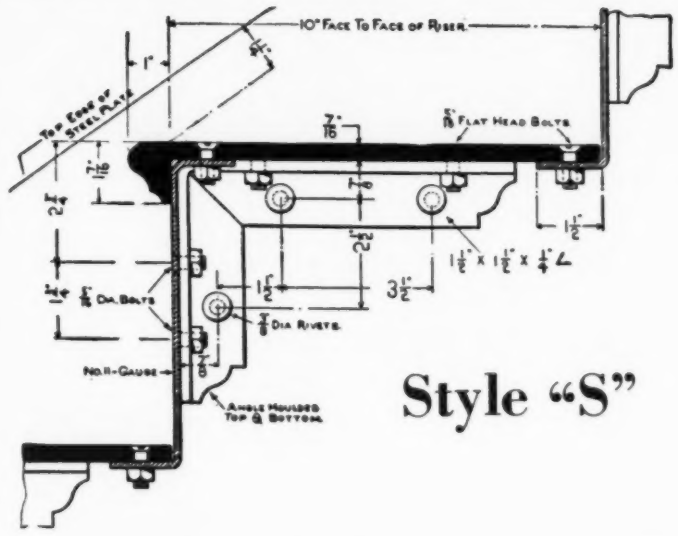

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proposed during the year. R. E. Burdick, superintendent of schools.

Auburn. During the year 1931 the school board plans the erection of a senior high school with accommodations for 1,000 students. The board contemplates a bond issue of $700,000 on Aug. 1, 1931. George F. Barford, superintendent of schools.

Amsterdam. The school board is completing a large high school, at a cost of $700,000, and an eight-room elementary school at a cost of $225,000 during the year 1931. Wilbur H. Lynch, superintendent of schools.

Glens Falls. The school board has under construction a new school to cost $300,000, and an addition to another building to cost $100,000. A. W. Miller, superintendent of schools.

Ithaca. The school board has received bids for the erection of a junior high school to cost approximately $450,000. C. L. Kulp, superintendent of schools.

Mt. Vernon. The school board will shortly ask the voters to approve a bond issue of $1,137,000 for the erection of a junior high school to cost $872,000 and an elementary school to cost $265,000. At the present time, the board has under construction two junior-high-school additions, and an elementary school. W. H. Holmes, superintendent of schools.

New Rochelle. During 1931 the school board will build a 24-room addition to the senior high school, at a cost of approximately $400,000. The bond issue for the next year will be in the neighborhood of $500,000. At the present time, the board has under construction an addition to the Roosevelt school to cost $252,000 and a new elementary school to cost $425,306. Albert Leonard, superintendent of schools.

Port Chester. The school board has received bids for the construction of a new high school, for which an appropriation of $1,350,000 has been made. Alvah G. Frost, superintendent of schools.

Rome. During the year 1931 the school board plans the erection of a school shop, at a cost of $15,000. George R. Staley, superintendent of schools.

Schenectady. During the year 1930–31, the school board plans the erection of a senior high school in the Mont Pleasant section, at a cost of $1,200,000. The building will be ready for use in September, 1931. W. H. Pillsbury, superintendent of schools.

Troy. The school board is completing the erection of a grammar school, at a cost of approximately $500,000. Wm. A. Dunne, secretary, board of education.

North Carolina

Winston-Salem. The school board will begin the erection of an addition to the white senior high school during the year 1931. The building will involve an expenditure of $785,000, for which bonds have already been sold. At the present time, the board has under construction a school building costing $300,000 for grounds and equipment. The building which was begun in 1930 is to be completed early in 1931. R. H. Latham, superintendent of schools.

Greensboro. The school board is erecting a six-room school for colored pupils which will be completed during the present year.

Salisbury. During the year 1931, the school board will erect a school for negro children, at a cost of $60,000. E. J. Coltrane, superintendent of schools.

North Dakota

Grand Forks. The school board has selected a site for a junior high school in the south section of the city in 1931. Another project will be the completion of the plant in the central section, to house a complete six-year high school. A site for another junior high school has been obtained, work on which will be begun in about four years. J. C. West, superintendent of schools.

Ohio

Columbus. The school board contemplates the erection of one elementary school. A bond issue of $200,000 has been proposed. G. E. Roudebush, assistant superintendent of schools.

Alliance. The school board has in hand a ten-room school building, to cost approximately $125,000. It will be ready for use in September, 1931. No other project is planned for 1931. B. F. Stanton, superintendent of schools.

Chillicothe. At the present time, the school board has under construction one high school, to cost approximately $400,000. No further building project is planned for 1931. W. L. Miller, superintendent of schools.

Cincinnati. The school board has adopted an extensive school-building program, calling for the erection of three elementary schools at a cost of $350,000 each, an elementary-junior high school to cost $750,000, and a high school to cost $1,250,000. The expected issue of bonds during the fiscal year 1931 will amount to $1,170,000. Edward D. Roberts, superintendent of schools.

Cleveland. Construction work has started on the junior-senior high school, to cost, with equipment, a total of $890,000. During the year 1931, the board contemplates the erection of another junior-senior high school to cost $700,000, and a senior high school to cost about $700,000. A third proposed project will be the building of an addition to an old building used as a junior high school, to cost $350,000. No additional bond issues are proposed for 1931. G. E. Irons, assistant superintendent of schools.

Hamilton. During the year 1931, the school board contemplates the erection of one new building, to cost approximately $375,000. No bond issue is proposed for the year 1931. D. R. Baker, superintendent of schools.

Lancaster. During the year 1930–31, the school board will complete its building program, calling

(Continued on Page 101)

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Telescopic Hoist
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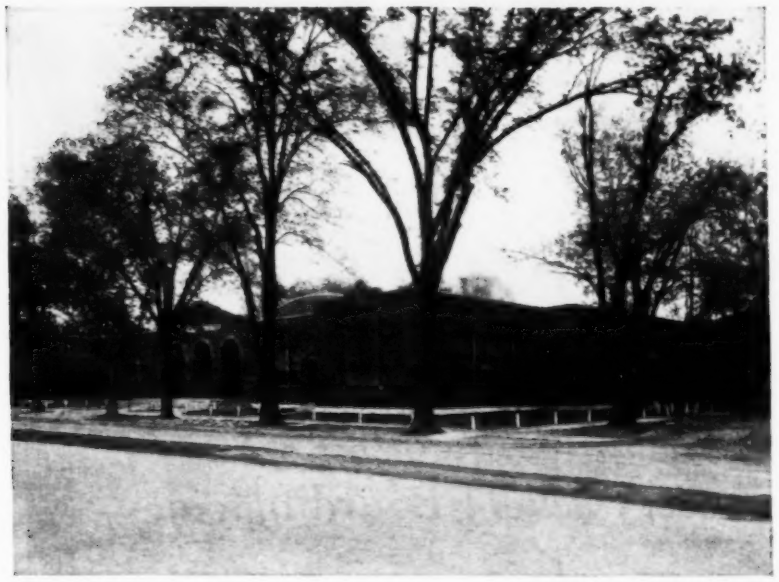
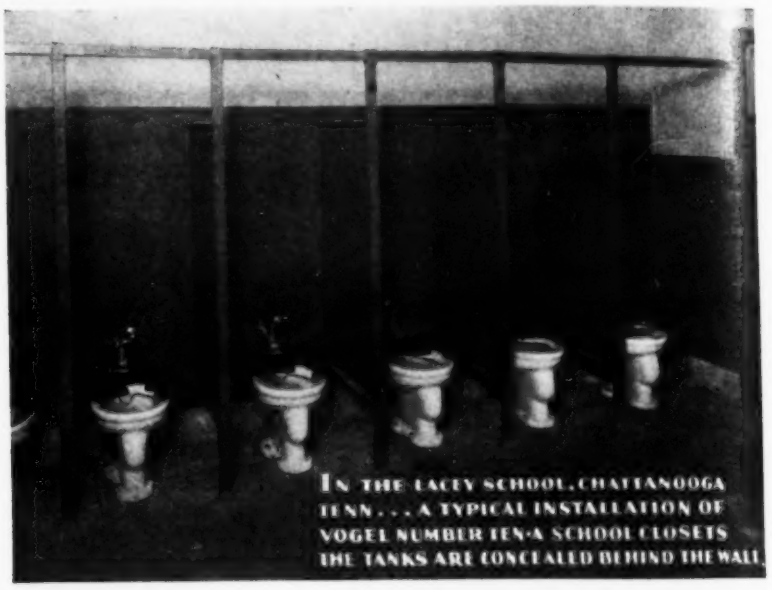
SOME INSTALLATIONS OF VOGEL NUMBER TEN AND TEN-A CLOSETS IN PROMINENT SCHOOLS THROUGHOUT THE COUNTRY . . . .



The Lacey School, Chattanooga, Tenn., where Vogel Number Ten-A's have been installed.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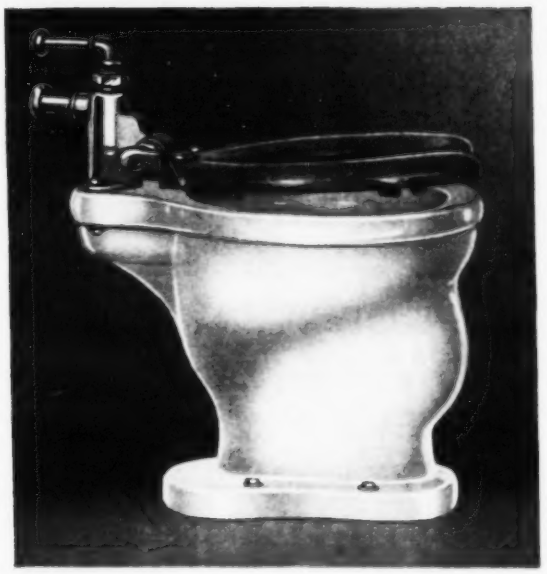

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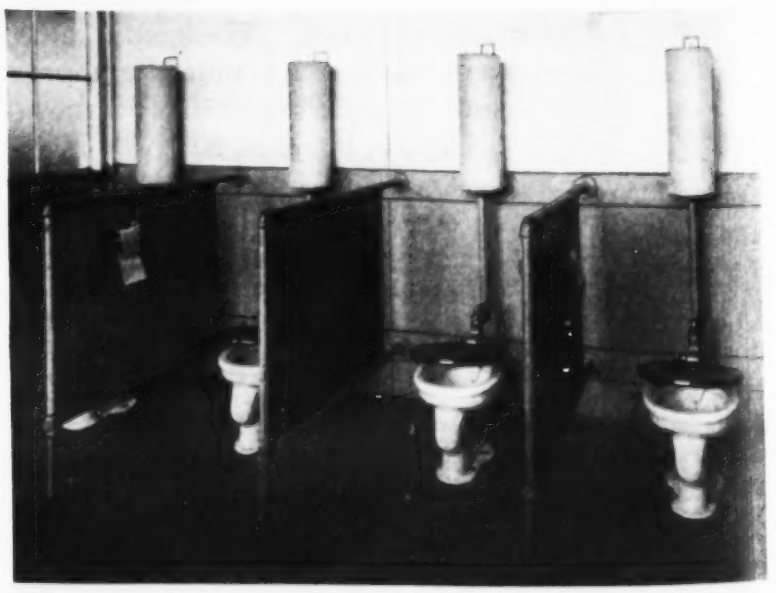

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In order that we would know and not just guess how long a VOGEL Closet would operate without repairs, we took one from stock and placed it on an endurance test. An illustration of the test is shown on this page. By means of a mechanism, the closet operated day and night continuously. The test started July 16, 1929, and still continues. To date the closet has flushed 240,000 times, and not even a washer has been renewed. This is the equivalent of 67 years' use.

Showing a Vogel Number Ten-A on endurance test. This closet has flushed 240,000 times, equal to 67 years' use.

Together with the economy and efficiency, VOGEL Closets have all the good looks and appearance of the most expensive closets. In the case of the Number Ten, the tanks are exposed, and may be enameled, if desired. With the Number Ten-A, the tanks are concealed behind the wall.

We have designed a book especially for school boards and architects which will be very helpful no matter what type of closet you intend to install in your school. A copy of this book will be sent promptly upon request.

VOGEL Number Ten and Ten-A Closets are made by a concern specializing in the manufacture of seat-action closets for more than 24 years. Remember VOGEL Closets are seat-action — children cannot forget to flush them.

Vogel Number Ten and Ten-A Closets can be furnished with hard rubber or composition seats with open or closed front, and also with juvenile height bowl.

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Vogel "Selfish" Ten and Ten-A Closets for installation in schools, institutions, comfort stations, factories, and plants, office buildings, theatres, moving picture houses, waiting rooms, of all sorts—also in residence basements.

Vogel "Selfish" Number Ten-A seat-action closet, combination, and semi-concealed.

VOGEL FROST PROOF WATER CLOSETS
For use in outhouses, garages, mill villages, and high rear porches—any place exposed to freezing temperatures.

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VOGEL FROST-PROOF HYDRANTS
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All Vogel Water Closets are seat action—that is, body operated. There are no chains to pull, or levers to push—no balls or floats to leak, wear out, or cause trouble—and no forgetting to flush.

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This is Bulletin Number 1 of a series illustrating and describing fully VOGEL Frost-Proof and Non-Frost-Proof Closets and VOGEL Frost-Proof Hydrants

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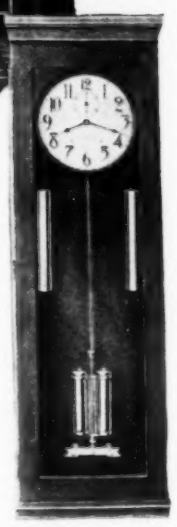
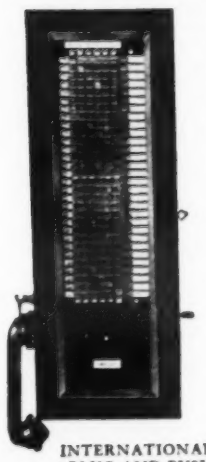
...“Completely satisfied”—is the unanimous and enthusiastic verdict rendered by hundreds of school administrators who are using International Supervised Time and Program Systems. Satisfied because of the unparalleled precision and efficiency which this modern equipment brings to the handling of complex school routine.

...International has made such satisfying results possible by the introduction of AUTOMATIC SUPERVISION—a distinctive electrical development that perfectly coordinates the operation of an entire system of clocks, bells, buzzers, gongs, etc., and entirely eliminates manual operation, checking and setting.

...Ask the nearest International Time Specialist to tell you more about this wonderful precision method of school time control.

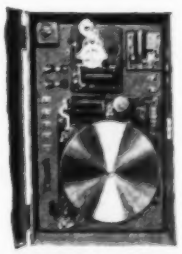


INTERNATIONAL MASTER CLOCK



INTERNATIONAL PLUG AND PUSH BUTTON BOARD

INTERNATIONAL PROGRAM BELL



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Continuous Water-proof hinge. Patents applied for.

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In-swinging Sashes permit controlled ventilation, without unpleasant drafts.

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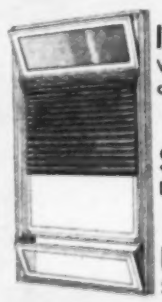
May be washed entirely from the inside.



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When closed, insulation between sash and frame protects against weather.

SAFETY
Difficult for anyone to fall or leap out.

NOISELESS
Sealair Windows will not rattle—operate easily, silently and independently.

Furnished in Bronze, Aluminum Alloy or Steel. All joints strongly welded.

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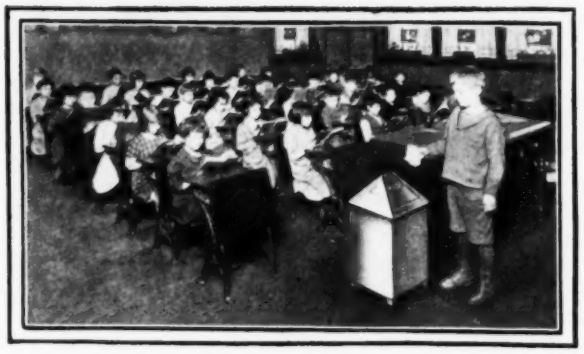
Manufacturers of
RUSTLESS METAL STORE FRONTS, WINDOWS AND DOORS

In the classroom ——



In the classroom, where the children spend so much of their time while at school, it is vitally important that the highest possible degree of sanitation be observed.

The Solar System of Sanitation, by providing convenient stations for the deposit of waste material, completely eliminates rubbish in and about the building. This elimination means the removal of breeding places for disease-carrying germs and flies.

The gravity-operated top of the patented Solar holds a mysterious fascination for children. Almost like magic it swings open at their slightest touch and silently closes again when waste material is safely deposited within. By means of the Solar System of Sanitation, the students themselves become an important part of the sanitation system.

Wherever waste accumulates, Solars will help you in your constant war against disease, fire, disorder, and expense.

Solar Sanitation experts are ready and anxious to help you. Send us the plans of your building and we will gladly draw up a complete estimate of the cost of installing a Solar System of Sanitation.

THE SOLAR CF WASTE DISPOSAL SYSTEM © 1930

ELIMINATES WASTE ACCUMULATION IN

Corridors	Playgrounds
Classrooms	Manual Training
Offices	Cafeteria
Lavatories	Domestic Science
Lobbies	Gymnasium
Laboratories	Locker Room

SOLAR-STURGES MFG. CO.

MELROSE PARK, ILLINOIS

(Continued from Page 96)

for the erection of an addition to the West building, an elementary school in the south section, and a high school. The total contract for the three buildings will reach $424,167. No bond issue is contemplated for the year 1931. J. J. Phillips, superintendent of schools.

Marion. The school board has under construction at the present time a junior high school, to be completed next summer, at a cost of $315,000. A site has been purchased for a future senior high school which has not been included in the present building program. The board has completed the erection of a ten-room elementary school, with auditorium, at a cost of $115,000. G. W. Bowman, superintendent of schools.

Tiffin. During the year 1931 an addition will be built for the Columbian High School, at a cost of $115,000. The building will be completed and ready for use in September, 1932. A twelve-room grade school was completed in January, 1931, at a cost of $135,000. C. A. Krout, superintendent of schools.

Toledo. The school board has begun the construction of the DeVilbiss High School, which will be completed at a cost of $1,500,000. In addition, a school for crippled children will be erected at a cost of $200,000, and two additions for elementary schools, at a cost of $100,000 each. C. S. Meek, superintendent of schools.

Ohio

Akron. The school board has three school buildings under construction, including the Voris Elementary School costing $300,000; the first unit of the Buchtel High School costing $500,000; and the first unit of the North Hill High School costing $500,000. No bond issue is proposed for 1931. F. W. Gosling, superintendent of schools.

Oklahoma

Sapulpa. During the year 1931 the school board will build a small addition to one of the schools, at a cost of $5,000. The board recently completed a new school, at a cost of $25,000. Max Chambers, superintendent of schools.

Muskogee. During the year 1931 the school board will have four buildings under construction. These will include two additions to elementary schools and an addition to the junior high school at a cost of $115,000, and an addition to the senior high school at a cost of $80,000. C. K. Reiff, superintendent of schools.

Pennsylvania

Altoona. The school board has $1,200,000 of a $2,000,000 bond issue still remaining, which may be used for proposed school construction work in 1931. No details are available as to the buildings or their cost. R. E. Laramy, superintendent of schools.

McKeesport. The school board has $980,000 remaining of a bond issue of $1,500,000, which will be expended for new school construction work during 1931–32. Plans have been prepared for a trade school to cost $600,000, and for additions to two schools, at a cost of $150,000. J. B. Richey, superintendent of schools.

Scranton. During the year 1931, the school board contemplates the erection of a junior high school at a cost of $1,000,000. At the present time, the board is completing a grade school at a cost of $170,000, and an addition to a high school at a cost of $1,000,000. The building program is being financed by a bond issue of $5,000,000. J. H. Dyer, superintendent of schools.

Pennsylvania

Pittsburgh. The school board contemplates a new building program for 1931. One school is now under construction costing approximately $300,000. B. G. Graham, superintendent of schools.

Chester. The school board has under construction an elementary school, to cost $150,000, and a 4-room addition to another school, at a cost of $31,846. A general building program is contemplated for 1931, but no bond issue has been planned. D. A. Ward, superintendent of schools.

Washington. Construction work has been started on a junior-senior high-school building for 1,700 to 2,050 pupils, to cost approximately $750,000. No other building project is planned for 1931. M. B. Horner, superintendent of schools.

Wilkes-Barre. The school board has completed the erection of a senior high school, at a cost of $2,000,000. No building project is planned for 1931. H. H. Zeiser, superintendent of schools.

Rhode Island

Cranston. The school board has awarded contracts for the erection of two elementary schools during the year 1931. These buildings will be completed by September, 1931, at a cost of $161,400 and $150,000 respectively. The amount of the bond issues for 1931 will reach $300,000. J. K. Fenner, superintendent of schools.

Pawtucket. The proposed amount of the bond issues for 1931 will be $500,000. W. A. Newell, superintendent of schools.

South Carolina

Charleston. During 1931 the school board will build an addition to the boys' high school, providing for a library and a study hall. A. B. Rhett, superintendent of schools.

Greenville. The school board has under construction an eight-room elementary school costing $30,000, and a ten-room colored trade school costing $375,000. No building projects are proposed for the year 1931. J. L. Mann, superintendent of schools.

South Dakota

Aberdeen. The school board contemplates the erection of an elementary school in 1931, at a cost of $70,000. Construction work will start on March 1. C. J. Dalthorp, superintendent of schools.

Tennessee

Bristol. Bonds have been approved by the voters for the erection of a senior high school and a central grammar school, but no bonds have been sold awaiting the results of the 1931 assessment.

A School Floor Finish That Does Not Scratch

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SOLVE your floor finishing problem by using Wis-Co-Lac. It is a glass clear, steel tough, permanently enduring floor finish. Dries hard in a short time. Can be walked on in half an hour. Scuffling feet do not scratch, dirt does not adhere and it remains beautiful with merely mopping it. Wis-Co-Lac was made especially for schools, where floors receive severest treatment. Contains no floor wax or oil. Impervious to hot water, grease and acids. Does not crack, chip, check, peel or blister and will not fade or change color. Write us for the many other features of advantage and a sample to test and try in your own school.

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DIVISION OF NATIONAL SCHOOL EQUIPMENT CO.

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The high school will be erected at a cost of $300,000, and the grammar school at a cost of $75,000. R.B. Rubins, superintendent of schools.

Texas

Lubbock. The school board plans to erect during 1931, an addition to the colored school at a cost of $7,500; an addition to the Mexican school; and an office building for the business department of the schools. The school board has under construction a senior high school for 1,500 students, to be erected at a cost of $650,000. M. H. Duncan, superintendent of schools.

San Antonio. During 1931, the school board contemplates the erection of a junior high school at a cost of $200,000, and a senior high school at a cost of $750,000. A bond issue of $1,750,000 was approved by the voters for financing these buildings. The school board has under construction a senior high school costing $1,100,000, and a junior high school costing $200,000. B. W. Hartley, superintendent of schools.

Sherman. During 1931, the school board contemplates the erection of an elementary school. A bond issue of $90,000 was approved by the voters. L. T. Cook, superintendent of schools.

Port Arthur. The school board is contemplating the adoption of the pay-as-you-go policy during 1931 for the financing of new school construction. G. M. Sims, superintendent of schools.

Dimmitt. The school board recently sold $35,000 in bonds for the erection of a physical education unit at the high school. C. A. Cryer, superintendent of schools.

Waco. The school board is planning the erection of the first unit of a junior high school during 1931. The cost of the building will be $125,000. No bond issue is contemplated. B. B. Cobb, superintendent of schools.

Utah

Salt Lake City. The school board has awarded the contract for the construction of a senior high school, at a cost of $1,000,000. The building is to be completed by September, 1931. G. M. Child, superintendent.

Virginia

Petersburg. The school board has asked the city council to approve a recommendation for the erection of an additional small school building, at a cost of $40,000 to $50,000. H. G. Ellis, superintendent of schools.

Alexandria. The school board has begun the preparation of plans for a high school. The plans have been submitted to the city council for approval. R. C. Bowton, superintendent of schools.

Washington

Bellingham. The school board contemplates a possible bond issue of $750,000 during 1931. The only building work under way at the present time is an addition to the Fairhaven High School, costing $18,000. D. E. Wiedman, superintendent of schools.

Bremerton. During the coming summer, the school board contemplates building a 3-room addition to the Naval Avenue School, at a cost of $12,000. T. Peterson, superintendent of schools.

Spokane. During the year 1931, the school board plans the erection of a senior high school at a cost of $500,000. No bond issue is proposed for next year. The school board has completed the erection of additions to three elementary schools, at a cost of $125,000. O. C. Pratt, superintendent of schools.

West Virginia

Charleston. During the year 1931, the school board plans the erection of the Fruth elementary school, at a cost of $148,818, and the Mt. Ovas elementary school, at a cost of $29,892. The board has completed an extensive building program, including new buildings, and additions, at a cost of $503,752. F. L. Teel, superintendent of schools.

Wisconsin

Oshkosh. The school board plans the erection of a junior high school costing $175,000 during the year 1931. A bond issue of $175,000 will be voted. C. C. Bishop, superintendent of schools.

Wausau. During 1931, the school board contemplates the erection of the first unit of a grade school, at a cost of $120,000. A bond issue of $110,000 will be voted. S. B. Tobey, superintendent of schools.

Superior. The school board has let the contract for an addition to the Central High School, to cost $110,000. Another building project is the erection of a shop building for the vocational school board which is expected to cost $60,000. These projects will be financed by bond issue. Miss L. M. Pickett, superintendent of schools.

Waukesha. The school board has under construction a vocational school costing approximately $65,000. The building provides six classrooms for academic subjects and six shops for the manual arts department. G. O. Banting, superintendent of schools.

Wauwatosa. The school board contemplates the erection of a junior high school in 1931, at a cost of $250,000. The proposed amount of the bond issues for 1931 will be $300,000. W. T. Darling, superintendent of schools.

Green Bay. The school board has under construction an elementary school, which is to cost $150,000. The building will be completed during the early part of the next year. H. F. Sutton, superintendent of schools.

Massachusetts

Boston. The school board has under construction fourteen buildings and four additions to schools, involving an expenditure of $5,502,995. The board contemplates the raising of $2,000,000 to $3,000,000 in bonds, and $3,000,000 from the tax levy for school-building purposes in 1931. J. C. Brodhead, assistant superintendent of schools.

Peabody. At present two additions to school are under construction, one a 12-room addition, to be completed at a cost of $166,000; the other a 4-room addition to cost $40,000.

GOOD FOR PLAY
GOOD FOR WORK

SIMONS PARK FIELD HOUSE

RIIS PARK FIELD HOUSE

BLACKHAWK PARK FIELD HOUSE

KELVIN PARK FIELD HOUSE

SCHOOL executives who are planning to build or remodel a gymnasium will be interested in one item of the equipment of the Northwest Park Field Houses, in Chicago. All four buildings illustrated have gymnasium floors of Sealex Battleship Linoleum.

Durable, shock-absorbing, sanitary—Sealex Battleship, Jaspe and Inlaid Linoleums have long been known as ideal floors for classrooms and corridors. They succeed equally well in the gym.

For basketball and handball, Sealex Linoleum gives an excellent playing surface. In addition to being a good floor for walking, playing, working, and dancing—it is *safe* . . . a safe floor to fall on! Physical directors tell us the type of injury known as "floor burns" is practically eliminated when this resilient, "no-splinter" material is installed.

An interesting point in the gymnasium shown is that the marker lines are as permanent as the floor itself. They are linoleum, actually inlaid in the floor. For further information on resilient school floors, address our Department S .

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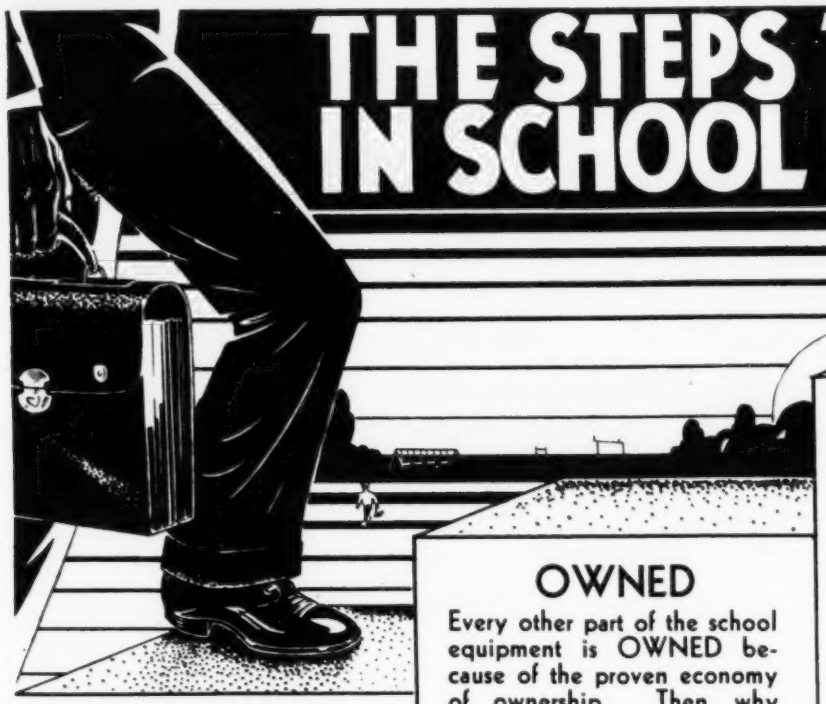

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Telephones are indispensable to the efficient operation of a modern school of medium or large size.

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Every other part of the school equipment is OWNED because of the proven economy of ownership. Then why handle the inter-departmental telephone system on any other basis?

Ownership means CONTROL with economy and greater satisfaction.

AUTOMATIC

To secure instant communication day or night and during emergencies such as fire, an automatic system is essential.

An automatic system assures speed, secrecy, accuracy and ease of operation.

It offers a minimum of effort and time for conveying a message, and operating costs are very low.

ALL recent installations of telephones in schools, and there are hundreds, are of the automatic type.

"ALL-RELAY"

The ultimate in automatic Telephone Operation is achieved in the "ALL-RELAY" System—the modern development of the Automatic Telephone field. The "ALL-RELAY" system is entirely free from all routine maintenance requirements. It offers moderate first cost and simplicity of operation unequalled.

It handles all calls day or night with the same unchanging celerity and precision.

Instantaneous automatic ringing, conference feature, code call and other advantages add to the desirability of the "ALL-RELAY" System which is now in successful operation in scores of schools in all parts of the United States.

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WASHINGTON CORRESPONDENCE

A. C. Monahan, Formerly U. S. Bureau of Education

National Child Welfare Data

The following estimates presented at the recent White House Conference on Child Health and Protection held in Washington, D. C., will interest school authorities. They were made from the best available data. They are for the Continental United States.

There are 48,000,000 children in the United States. Approximately 28,000,000 of these are attending school; 4,000,000 have gone to work; 16,000,000 are under school age; 10,000,000 under 13 years of age, are church members; 200,000 get into the courts each year; 1,400,000 are "behavior problems"; 1,500,000 are especially gifted mentally; 450,000 are mentally retarded; 4,000,000 are suffering from handicaps; 6,000,000 are badly nourished; 1,500,000 have communicable diseases; 18,000 are killed by accidents each year; 3,000,000 go camping each summer.

Washington an Educational Center

The city of Washington has become one of the great educational centers of the world, in number of schools and other educational institutions, number of students enrolled, variety of institutions, types of courses given, proportion of population enrolled in schools and general educational facilities.

At the present time there are 142,500 students enrolled in all types of schools and colleges, taught by 6,368 teachers, in Washington and the immediate metropolitan area. One half of these are in the district's public schools. There are 33 private schools of various kinds, not including an equal number of Catholic parochial schools. There are seven institutions of university grade, with a total enrollment of over 20,000 students, the largest is George Washington with 6,200. These seven institutions include almost every type of professional school. Few cities boast the library facilities open to students from within and without the District. The Library of Congress with 4,000,000 volumes is the outstanding one. The Government departments' libraries, and the libraries of the universities and colleges are well known.

U. S. Indian Office to Assume Charge of Alaska Schools for Natives

Schools for the natives in Alaska, Eskimos and Indians, established and supervised by the U. S. Bureau of Education since their establishment, will be under the Indian Office of the Department of the Interior in the future under a recommendation of the Secretary of the Interior. For approval only a slight change in the wording of the annual appropriation act is required. A bill before Congress for money for the coming year is a proviso that it is to be spent on the approval of the Commissioner of Indian Affairs.

Affected by this proposed change are 93 schools, with 195 teachers, and an enrollment of 3,899 pupils. The appropriation for them for the present year is $580,400. At these schools medical relief is furnished the natives, for which an additional amount of $171,780 is provided. Among the 93 schools are included three industrial schools costing approximately $150,000 for maintenance. A site has been selected and plans drawn for a fourth which will be a boarding school, four miles from Wrangell in Southeastern Alaska. Four additional day schools have been opened to care for children in villages now without schools. A home for orphans has been established at the former Fort Gibbon, at Tanana, which cares for orphans and homeless children of preschool age, formerly cared for in one of the industrial schools.

In connection with the educational work of the Bureau of Education in Alaska, was the reindeer industry growing out of an importation of a few reindeer by the bureau in 1892, the number now being approximately 600,000. This undertaking was begun to furnish a means of subsistence and clothing for the natives in the neighborhood of Bering Strait, who were in danger of exhausting their precarious food supply. The supervision of these reindeer herds, now in all parts of Alaska, was one of the duties of the principals of Bureau schools. They were relieved of this work during the year, the entire reindeer industry being transferred from the supervision of the bureau of education to that of the Governor of Alaska. It was an interdepartmental transfer, as the Governor of Alaska is responsible to the secretary of the interior.

Another administrative change affecting the educational work in Alaska is the transfer of the Office of the Chief of the Alaska Schools from Seattle, Wash., to Juneau. The purchasing agent for the schools will remain at Seattle.

The medical relief work has been an important part of the activities of the Bureau of Education in connection with its administration of the schools for natives. It employs for this phase of the work 9 physicians and 29 nurses.

School Needs of the District of Columbia

Dr. Frank W. Ballou, superintendent of schools of Washington, in a recent public statement, shows that there are now in the public schools of the District 3,254 more pupils than a year ago. Of these, 1,098 are in senior high schools; 735 in junior high schools; and 1,435 in elementary schools. With such a rate of increase, Washington will need two high schools every three years, each for 1,500 children, one junior high, and four 8-room elementary buildings every year. The budget proposed for 1932 cares for these requirements.

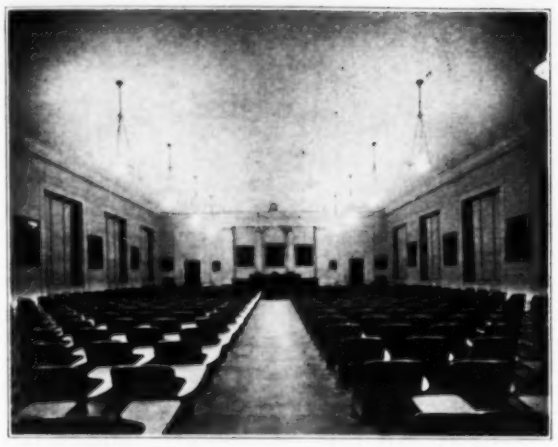
The board of education is considering the advisability of discontinuing the use of portable buildings in new developments and the relief of congestion in certain schools, by providing busses to transport children to schools in other sections where there may be room for them. Several buildings in first-class condition are not now used to capacity because the population in the district has shifted elsewhere. To transport the children to these would be to the educational advantage of the children and would cost less than the erection of portables.

Canvassing in Schools

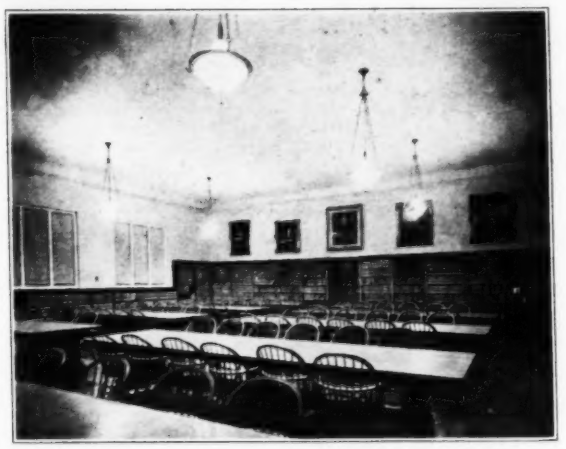
The board of education of the District of Columbia, at a recent meeting, voted not to permit the sale of Christmas seals in the schools. The board has stood against any type of canvassing in the schools, but a special plea was made to permit the sale of seals this year because of the unusu

(Concluded on Page 106)

Harvard *uses* HOLOPHANE

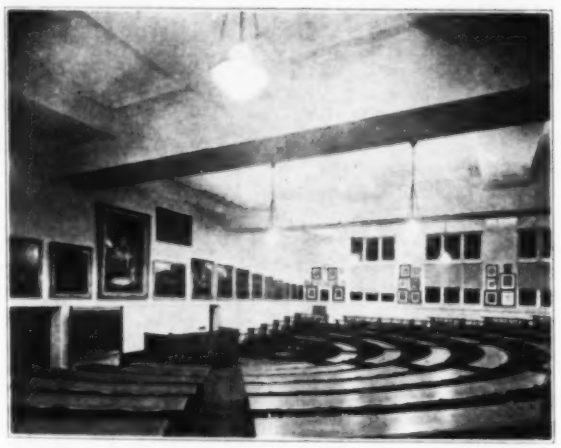


South Lecture Hall in Langdell Hall.

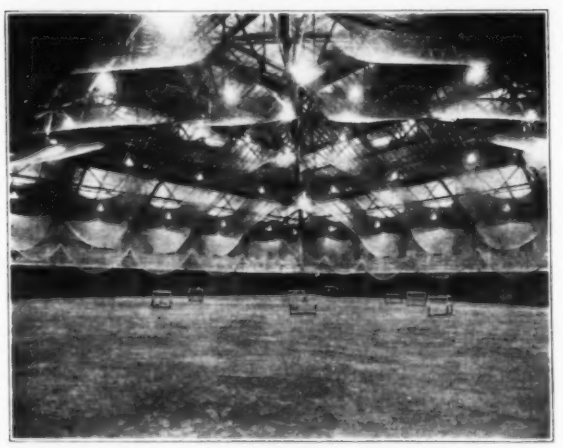


The North Wing Reading Room.

Holophane Trade Mark



Court Room.



Gymnasium and Baseball Cage.

HARVARD UNIVERSITY has found that Holophane Lighting Units give the best quality of illumination, and that the Holophane principle of building a *specific* unit for each specific lighting requirement makes it possible to have the best illumination *anywhere.*

Here are shown just a few of the places in which Harvard uses Holophane Lighting Units. Many others could be shown; for instance, the particularly interesting installation of Holophane Bookstack Units used to spread light evenly over rows of bookstacks which are only about three feet apart. These are night-time photographs—*not* retouched.

Write for booklet—"Better School Lighting."

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Laboratory Products
assure dependability

PERFECT *balance of ingredients* is quite as important in compounding a truly good toilet soap as the concentration or true soap content of the liquid. Quality soap must be made from *pure, high grade ingredients* and perfect balance can only be secured by *the most careful laboratory methods.*

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The HUNTINGTON LABORATORIES, Inc.
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LIQUA-SAN
The Liquid Soap

(Concluded from Page 104)

conditions prevailing. The board confirmed its rule prohibiting the solicitation of funds from school children in the schools for any reason, but instructed teachers to call the attention of children to the seals and the purpose for which they are sold.

Football Fatalities

School authorities will be interested in a study of the number of fatalities occurring in the annual football season. The results of a national canvass have just appeared in a Washington paper, showing that there were 13 deaths in the season just closed. Of these, 8 were on high-school teams, 4 on college teams, and 1 on an independent team. In the years 1925 to 1930, the number of football players killed was 20, 9, 17, 18, 12, and 13, respectively. There is no record of the number seriously injured. It appears that the game cannot be regarded as especially hazardous, as the insurance companies have not placed an extra levy on insured players.

Educational Directories

Two well-known educational directories will be available in the near future, the annual directory of the U. S. Office of Education and the biennial directory of the Catholic Colleges and Schools of the United States. It contains the names of federal education officials; state, city, and county superintendents of schools; the names of presidents of colleges and universities; the deans of the more important professional schools; the presidents of teacher-training schools; secretaries of educational associations; and the names of the educational journals published in the United States. The Catholic Educational Directory contains statistical information relative to the Catholic Colleges and Schools, as well as the names of the officials. It lists all universities, colleges and secondary schools.

THE WHITE HOUSE CONFERENCE

The White House Conference on Child Welfare and Protection, held November 19–22, in Washington, D. C., was one of the important events of the Hoover administration. The results of the conference are expected to be of great worth to each state and community in the findings, recommendations, and standards promoted and put into practice in each state. The president of the conference suggested that similar child-welfare conferences be held in each state, and that public sentiment be created demanding local action in accordance with the recommendations of the conference.

A nineteen-point summary in general terms of the rights of the American child was presented and adopted as the conclusions of a year's intensive expert study. The conclusions adopted by the conference were as follows:

1. Every child is entitled to be understood and all dealings with him should be based on the fullest understanding of the child.

2. Every prospective mother should have suitable information, medical supervision during the prenatal period, and competent care at confinement. Every mother should have postnatal medical supervision for herself and child.

3. Every child should receive periodical health examinations before and during the school period, including adolescence, by the family physician, or the school or other public physicians, and such examinations by specialists and such hospital care as its special needs may require.

4. Every child should have regular dental examination and care.

5. Every child should have instruction in the schools in health and in safety from accidents, and every teacher should be trained in health programs.

6. Every child should be protected from communicable diseases to which it might be exposed at home, in school, or at play, and protected from impure milk and food.

7. Every child should have proper sleeping rooms, diet, hours of sleep and play, and parents should receive expert information as to the needs of children of various ages as to these questions.

8. Every child should attend a school which has proper seating, lighting, ventilation, and sanitation. For younger children, kindergartens and nursery schools should be provided to supplement home care.

9. The school should be so organized as to discover and develop the special abilities of each child, and should assist in vocational guidance, for children, like men, succeed by the use of their strongest qualities and special interests.

10. Every child should have some form of religious, moral, and character training.

11. Every child should have a right to play, with adequate facilities therefor.

12. With the expanding domain of the community's responsibilities for children, there should be proper supervision for and supervision of recreation and entertainment.

13. Every child should be protected against labor that stunts growth, either physical or mental, that limits education, that deprives children of the rights of comradeship, of joy, and play.

14. Every child who is blind, deaf, crippled, or otherwise physically handicapped, should be given expert study and corrective treatment where there is the possibility of relief, and appropriate development or training. Children with subnormal or abnormal mental conditions should receive adequate study, protection, training, and care.

Where the child does not have these services due to inadequate income of the family, then such services must be provided to him by the community. Obviously, the primary necessity in protection and development of children where poverty is an element in the problem is an adequate standard of living and security for the family within such groups.

15. Every waif and orphan in need must be supported.

16. Every child is entitled to the feeling that he has a home. The extension of the services to the community should supplement and not supplant parents.

17. Children who habitually fail to meet normal standards of human behavior should be provided

(Concluded on Page 109)

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. . . *and will then put down his findings on the chart as a permanent record to insure the best possible treatment for your floors.*

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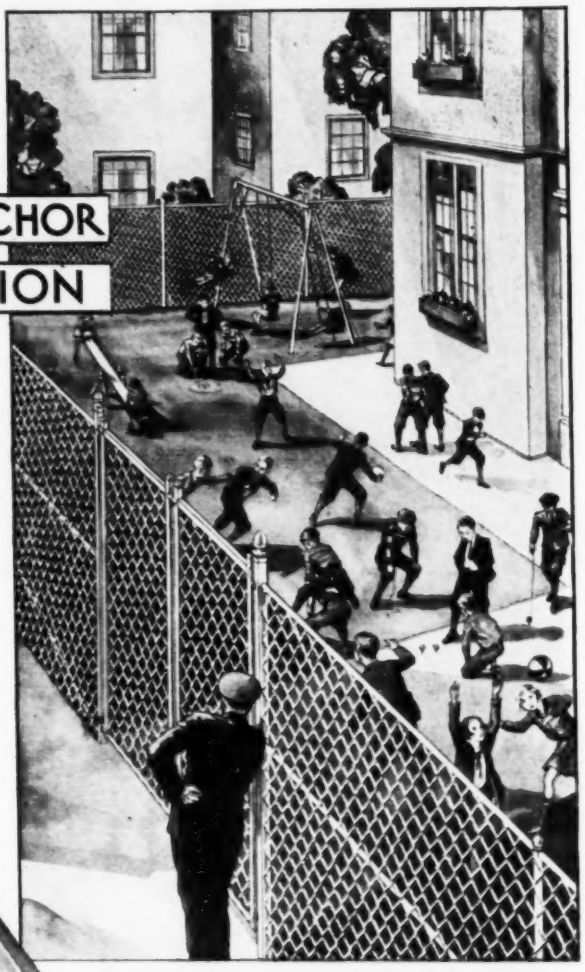

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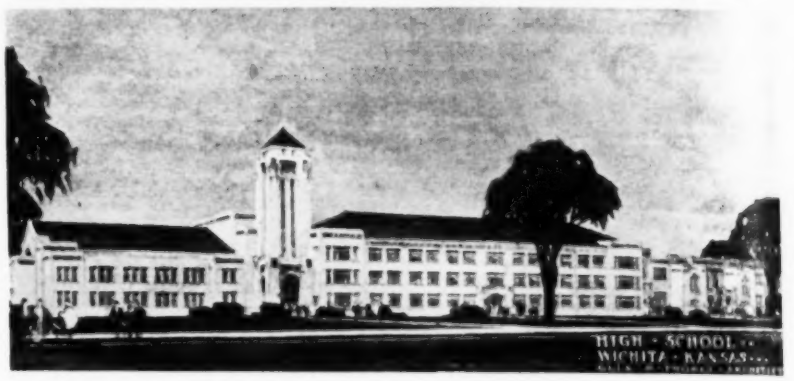

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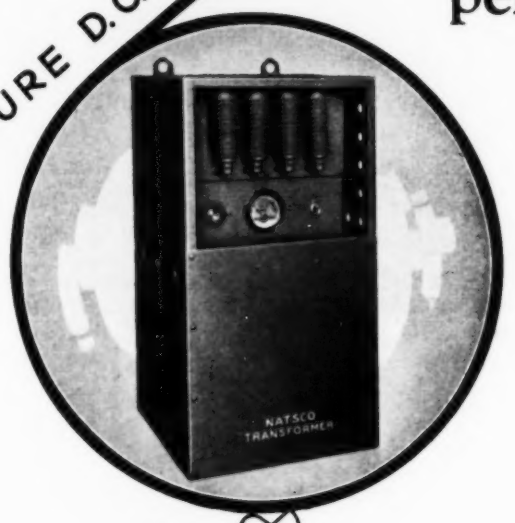

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(Concluded from Page 106)

special care under the guidance of the school, the community health or welfare center, or other agency for continued supervision, or if necessary, control.

18. The rural child should have satisfactory schooling, health, protection, and welfare facilities.

19. In order that these minimum protections of health, and welfare of children may be everywhere available, there should be a district, county, or community organization for health education and welfare, with full-time officials, coördinating with a state-wide program which will be responsible to a nation-wide service of general information, statistics, and scientific research. This should include trained full-time public health officials, available hospital beds, full-time public welfare services for the relief and aid of children in special need, and the development of voluntary organization for purposes of instruction, health, and recreation through private effort and benefaction.

It is the purpose of the conference to establish the standards by which the efficiency of such services may be tested in the community and to develop the creation of such services. The conference recommended that a continuing committee be appointed by the president, to study points upon which agreement has not been reached, to develop further standards, and to encourage the establishment of services for children.

♦ Attorney General C. A. Sorensen, of Nebraska, has rendered an opinion, in which he holds that it is lawful for a school board to have a schoolhouse insured in a mutual insurance company, provided such company's articles of incorporation are approved by the state insurance bureau. Under the Nebraska law, a mutual insurance company is not an assessment company. A mutual company is one without capital stock, which charges a fixed premium and is required to maintain the same reserve as a stock company.

SCHOOL LAW

School Funds

Where schools are maintained for children between 6 and 21, and the school fund is sufficient, the North Carolina general assembly has power to require the school board to provide kindergartens (private laws of 1907, c. 175; private laws of 1923, c. 16, §§125–139; private laws of 1929, c. 205; N. C. constitution, art. 9, §2). — Posey v. Board of Education of Buncombe county, 154 Southeastern reporter 393, 199 N. C. 306.

If the school fund is insufficient, and an additional tax is required to maintain kindergartens authorized by the North Carolina general assembly, the voters' approval must be obtained (C. S. Supplementary code of 1924, §5443; private laws of 1907, c. 175; private laws of 1923, c. 16, §§125–139; private laws of 1929, c. 205; constitution, art. 9, §2). — Posey v. Board of Education of Buncombe county, 154 Southeastern reporter 393, 199 N. C. 306.

The board of commissioners of Asheville and their successors are held authorized to maintain out of available school funds, or in their discretion, to discontinue, a junior college, (N. C. private laws of 1923, c. 16; private laws of 1929, c. 205).— Zimmerman v. Board of Education of Buncombe county, 154 Southeastern reporter 397, 199 N. C. 259.

The exercise of a school board's discretionary power under the statute to maintain or discontinue a junior college cannot be judicially reviewed (N. C. private laws of 1923, c. 16; private laws of 1929, c. 205). — Zimmerman v. Board of Education of Buncombe county, 154 Southeastern reporter 397, 199 N. C. 259.

Schools and School Districts

The New York education law, pertaining entirely to matters of school administration and policy, and providing for the consolidation of school districts, is held constitutional (N. Y. Education Law, 180–186). — Lair v. Grant, 244 N. Y. S. 427, 137 Miscellaneous reporter 470, N. Y. Sup.

Allegations complaining of consolidation under the New York education law did not state the cause of action, an appeal to the commissioner being exclusive remedy (N. Y. Education Law, §§180–186, and §890, subds. 6, 7). — Lair v. Grant, 244 N. Y. S. 427, 137, Miscellaneous reporter 470, N. Y. Supt.

School-District Property

A conveyance for use and benefit of the white children in a school district and no further did not impose a trust or condition subsequent working reversion of title. — Tucker v. Smith, 154 Southeastern reporter 826, 199 N. C. 502.

A school board holding a fee-simple title to land had authority to sell property and to execute the deed therefor (C. S. Suppl. code of 1924, §5470). — Tucker v. Smith, 154 Southeastern reporter 826, 199 N. C. 502.

Persons entering into a contract by which future revenues of the board of public instruction are attempted to be pledged for current expenses are chargeable with a notice of limitation on the board's authority (Fla. constitution, art. 12, §§8, 9). — Board of Public Instruction of Lafayette County v. Union School Furnishing Company, 129 Southern reporter 824, Fla.

A subcontractor could not recover against the surety on a bond given by the contractor to a school district, where the bond given was not additional bond required by the statute (53 PS, 521). — School Dist. of Reading v. New Amsterdam Casualty Co., 98 Pa. Super. Ct. 221, Pa. Super. Ct.

A surety on a contractor's bond is not generally liable to persons furnishing the labor and materials. — School Dist. of Reading v. New Amsterdam Casualty Co., 98 Pa. Super. Ct. 221, Pa. Super. Ct.

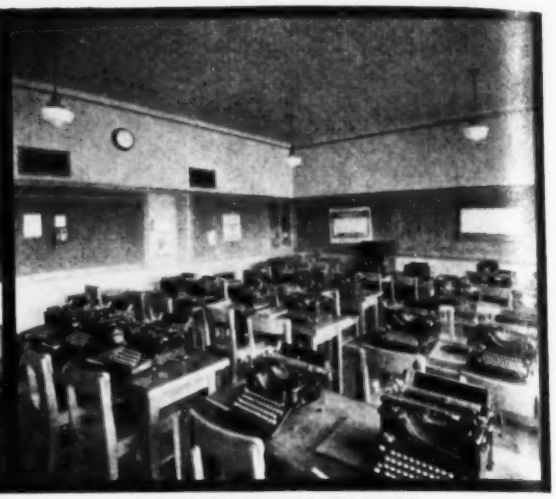
A stipulation in a contractor's bond that the contractor must pay the laborers and materialmen is not an acknowledgement of liability to those parties. — School Dist. of Reading v. New Amsterdam Casualty Co., 98 Super. Ct. 221, Pa. Super. Ct.

An additional bond required by the statute of contractors is intended to assure the payment of materialmen and laborers (53 PS, 521). — School

(Concluded on Page 112)

IN SWIMMING POOLS

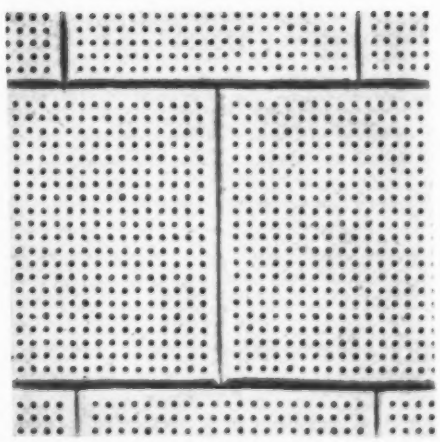
IN AUDITORIUMS



IN COMMERCIAL ROOMS

IN LIBRARIES

IN LECTURE HALLS



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School No. 47,
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Rochester, New York

Davidson College,
Davidson, North Carolina

High School,
Grand Forks, North Dakota

Kennedy School,
Cincinnati, Ohio

Senior High School,
Bartlesville, Oklahoma

Llewelyn School,
Portland, Oregon

Portsmouth School,
Portland, Oregon

St. Bartholomews Convent,
Philadelphia, Pennsylvania

Junior High School,
Memphis, Tennessee

Amarillo High School,
Amarillo, Texas

University of Texas,
Austin, Texas

Rutland High School,
Rutland, Vermont

North Side Jr. High School,
Richmond, Virginia

University of Washington,
Seattle, Washington

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San Francisco, California

University of Colorado,
Boulder, Colorado

East High School Auditorium,
Denver, Colorado

New Britain Senior High School,
New Britain, Connecticut

Yale University,
New Haven, Connecticut

Austin High School,
Chicago, Illinois

Franklin Grade School,
Quincy, Illinois

Purdue University,
La Fayette, Indiana

East End School,
Wichita, Kansas

Morehead Normal School,
Morehead, Kentucky

U. S. Naval Academy,
Annapolis, Maryland

Peabody Conservatory of Music,
Baltimore, Maryland

Massachusetts Institute of Technology, Cambridge, Mass.

University of Minnesota,
Minneapolis, Minnesota

Patrick Henry Jr. High School,
Minneapolis, Minnesota

Columbia High School,
S. Orange, New Jersey

Lander County High School,
Battle Mountain, Nevada

State Teachers College,
Hattiesburg, Mississippi

Great Falls High School Auditorium, Great Falls, Mont.

Grants Union High School,
Grants, New Mexico

Valdese High School,
Valdese, North Carolina

John Hay High School,
Cleveland, Ohio

University of Tulsa,
Tulsa, Oklahoma

Madison School,
Pittsburgh, Pennsylvania

Hartford Ave. Jr. High School,
Providence, Rhode Island

Brown University,
Providence, Rhode Island

William & Mary College,
Williamsburg, Virginia

Daniel Bagley School,
Seattle, Washington

Auditorium High School,
Wellsburg, West Virginia

Boys' Technical School,
Milwaukee, Wisconsin

McKenzie School,
Vancouver, B. C.

Mt. St. Mary's Academy,
Little Rock, Arkansas

University of Southern California, Los Angeles, Calif.

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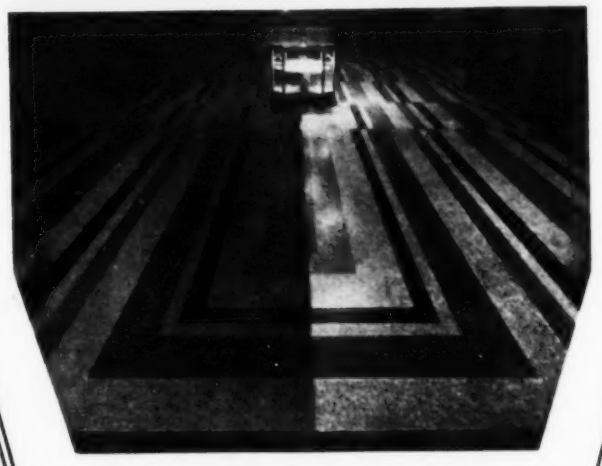

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(Concluded from Page 109)

Dist. of Reading v. New Amsterdam Casualty Co., 98 Super. Ct. 221, Pa. Super. Ct.

In an action by the materialmen an an additional bond given by the contractor to a school district, it was no defense that the bills of materials were not directly incurred by the contractor (53 PS, 521). — School Dist. of Borough of Eddystone v. Lewis, 98 Pa. Super. Ct. 227, Pa. Super. Ct.

A provision in an additional bond given by a contractor to a school district, limiting suits thereon to six months after due date of final payment, is held binding on the materialmen (53 PS, 521). — Scranton School Dist. v. Casualty & Surety Co., of Hartford, Conn., 98 Pa. Super. Ct. 599, Pa. Super. Ct.

School-District Taxation

That the revenue for the fiscal years wherein a teacher's salary became payable was subsequently exhausted, as by applying revenue to another year's indebtedness, did not relieve the district from liability (Calif. constitution, art. 11, §18). — Martin v. Fisher, 291 Pacific reporter 276, Calif. App.

The position of a public-school teacher is "employment by contract," and is not "office," as regards prohibition against applying the revenue on the previous fiscal year's indebtedness (Calif. constitution, art. 11, §18). — Martin v. Fisher, 291 Pacific reporter 276, Calif. App.

The liability for a teacher's salary being voluntarily created by a district, her demand for salary for each fiscal year while wrongfully dismissed, must be paid out of the revenues for such fiscal year (Calif. political code, §1609; Calif. constitution, art. 11, §18). — Martin v. Fisher, 291 Pacific reporter 276, Calif. App.

Purported obligations which a county board of public instruction had no authority to incur could not be validated by legislative enactment (Fla. constitution, art. 12, §§8, 9; Fla. complete general laws of 1927, §577). — Board of Public Instruction of Lafayette County v. Union School Furnishing Co., 129 Southern reporter 824, Fla.

A petition calling for a school-district bond election, based on an enumeration of qualified electors made by the members of the school board is held insufficient (Okla. complete statutes of 1921, §§9645, 9660–9681, 10283). — Loftis v. School Dist. No. 52 of Beckham County, 290 Pacific reporter 1101, Okla.

Teachers

The relation between a district and teacher is that of employer and employee, created by contract, dependent on the district's authority under the California law (Calif. political code, §1609; Calif. constitution, art. 11, §18). — Martin v. Fisher, 291 Pacific reporter 276, Calif. App.

The court erred in adjudging a district liable for a teacher's salary, in the absence of a finding concerning the amount of funds remaining at the end of the fiscal years wherein the liability arose (Calif. political code, §1609; Calif. constitution, art. 11, §18) — Martin v. Fisher, 291 Pacific reporter 276, Calif. App.

Pupils

A school district not having required a high-school course is held not obligated to pay the tuition of its pupils attending a high school other than a "standardized" high school (N. Dak. complete laws, suppl. of 1925, §1438a2). — State v. Alquist, 231 Northwestern reporter 952, N. Dak.

The North Carolina general assembly has power to prescribe by statute, subjects to be taught and methods of instruction in the public schools (N. C. constitution, art. 9, §2). — Posey v. Board of Education of Buncombe County, 154 Southeastern reporter 393, 199 N. C. 306.

The North Carolina general assembly is empowered to authorize school boards to exercise statutory power to prescribe subjects and methods of instruction in public schools (N. C. private laws of 1907, c. 175; private laws of 1923, c. 16, §125–139; private laws of 1929, c. 205; N. C. constitution, art. 9, §2). — Posey v. Board of Education of Buncombe County, 154 Southeastern reporter 393, 199 N. C. 306.

School-District Government

A statute making a requirement for the registration of the qualified voters inapplicable to a school-district election is held not to violate the constitutional provision (Okla. complete statutes of 1921, §6252; Okla. constitution, art, 3, §6). — Loftis v. School Dist. No. 52 of Beckham County, 290 Pacific reporter 1101, Okla.

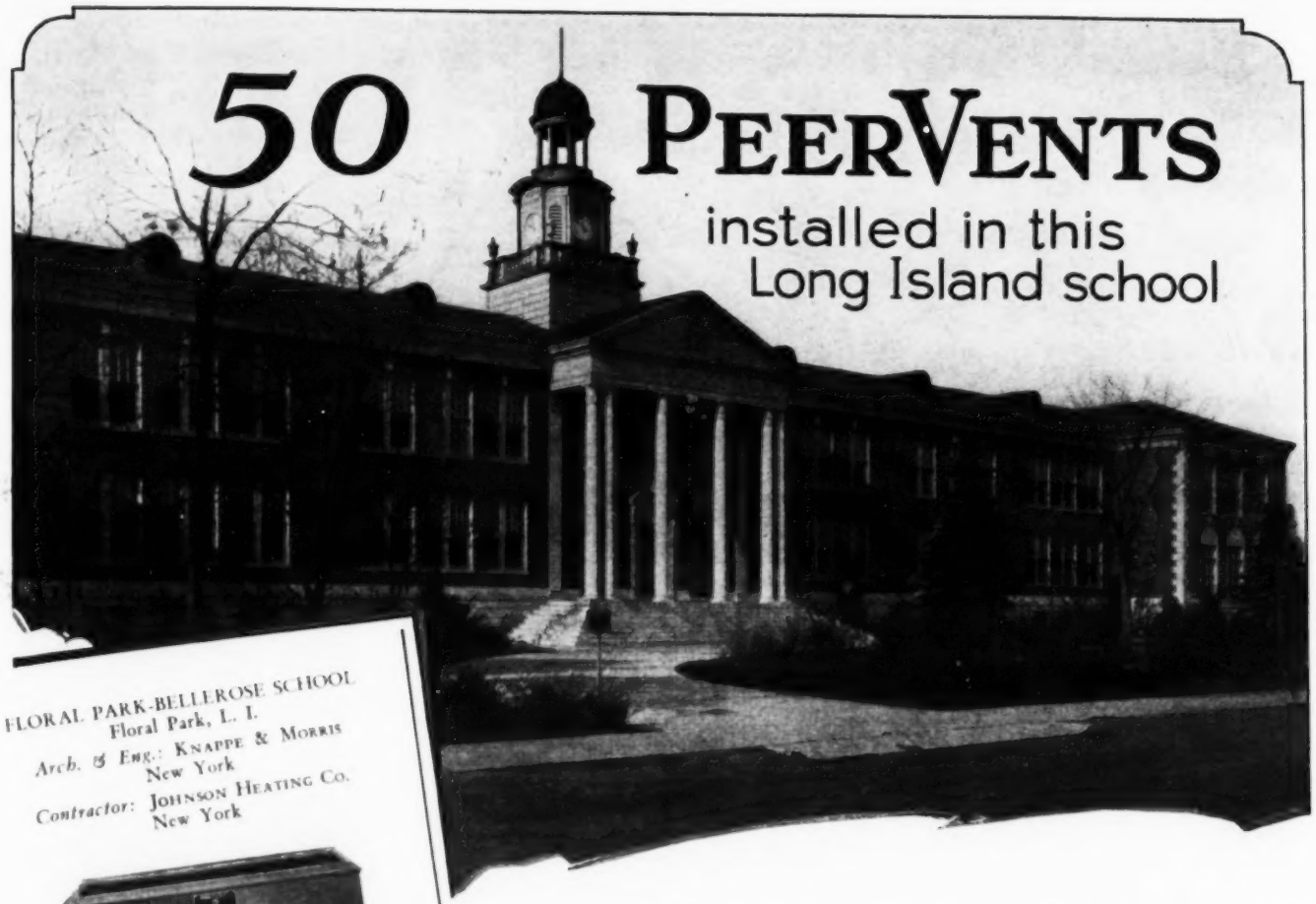
BUILDING NEWS

♦ Wilkes-Barre, Pa. The school board has completed the erection of a senior high school, at a cost of $2,000,000.

♦ Worcester, Mass. With the opening of the school year in September, the school system went on a new schedule with every pupil profiting by a full school day. The Lincoln Street School, which was opened in December, 1929, made possible the transfer of a group of children from two districts who had been housed in two portable buildings. The school plant will be further enlarged with the opening of the Providence Street Junior High School and an addition to the South High School. The board has taken steps toward the erection of additional schools and the purchase of sites for schools to be erected in the near future.

♦ The engineering extension division of the Iowa State College has announced a series of janitor-engineer conferences for the benefit of men responsible for the operation and care of physical school plants. The courses will be conducted as a part of the vocational teacher-training program under the direction of instructors connected with the teacher-training staff of the department. All instruction material developed by the several groups will be formulated for the use of janitor-engineers of the state, to serve as a means of organized instruction for head janitors, and as self-helps for those in smaller buildings who do not have assistants.

♦ The school board of Pittsburgh, Pa., has taken steps to accelerate the school-building construction work during the present winter to relieve the present unemployment conditions. The building program of the board involves contracts aggregating approximately $4,000,000, the work on repairs and improvements to buildings aggregating over $600,000 annually. The board has called for the coöperation of the striking builders' unions in order that labor and business may profit through the carrying out of the school-building program.



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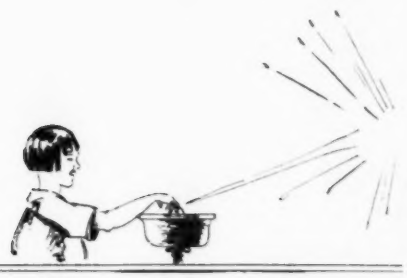
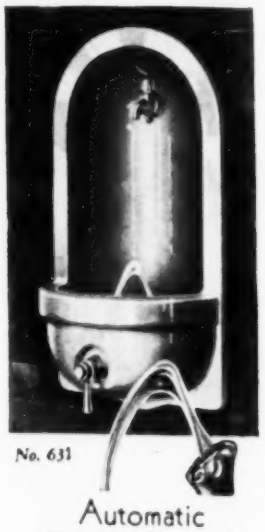


... Here's What Happens With Ordinary Fountains

The child, bless her heart. She likes to mess things up. You did, too, when you were her age. There goes the water squirting on the walls and the floor.

Administration Building for Nat'l Education Association, Washington, D. C. Frank Irving Cooper Corp. Architects



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Automatic Stream Control

Practical automatic stream control, two-stream projector—water never too high, never too low; no lips need touch projector. Non-squirting! No servicing.

No Squirting . . . That's one reason Halsey Taylor Drinking Fountains are safe—they're as safe from tampering as from the risk of contamination—just the fountains for school use, as thousands of trouble-free installations specify. Be sure to make it the SPECIFICATION FOR SANITATION—Halsey Taylor Drinking Fountains—The Halsey W. Taylor Co., Warren, O.

HALSEY TAYLOR *Drinking Fountains*

CHICAGO CORRESPONDENCE

For months there have been three vacancies in the membership of the Chicago board of education. Dr. Otto L. Schmidt, formerly a member, resigned, and two trustees whose terms had expired were "hold-overs" from the Dever administration. The joint committee on public-school affairs, an organization of leading civic associations, had urged the mayor to appoint certain persons suggested by them. Their candidates were not named. Organized labor, and other special groups, urged their candidates. Altogether more than one hundred candidates were after the positions.

Finally, on November 26, Mayor Thompson appointed the three new trustees. Mr. William D. McJunkin was named to succeed Mr. James Mullenbach, Mr. Joseph P. Savage to succeed Mr. Theophilus Schmid, and Mr. Boleslaw R. Kozlowski was named to fill the vacancy.

For the first time in months there is a complete membership on the board of education, eleven members, ten of whom are appointees of Mayor Thompson. The lone "opposition party" member is a woman, Mrs. Helen Hefferan, who does not hesitate to take issue with other board members. Recently Mayor Thompson requested the board of education to designate October 9 as an annual school holiday to be known as "Chicago day." Mrs. Hefferan protested that it would cost the taxpayers $271,878, one day's running expenses, and the proposition was defeated. The president of the board submitted a communication to the other trustees as follows: "I respectfully request the adoption of a resolution directing all department heads to give preference in the matter of employment to unmarried women, rather than to married women whose husbands are employed, upon the understanding, of course, that the request does not conflict with established rules of seniority and civil service." Mrs. Hefferan opposed this resolution. The question of married teachers and of teachers who live outside the city in the suburbs continually arises, but the matter never gets anywhere insofar as teachers already in service are concerned, because the Illinois teacher-tenure law operative for Chicago, stipulates that a teacher may be removed only for inefficiency, immorality, or insubordination, and even then only after a trial.

Dr. Arnold H. Kegel, commissioner of health, believes that school health is where education was 50 years ago. There are 435,000 Chicago school children suffering from 22 types of physical and psychical defects. Dr. Kegel urges a separate mill tax to support this phase of the schools alone, and proposes that "health centers" be established in different sections of the city.

A controversy involving the mayor and the superintendent of schools has enlivened the daily news columns recently. The mayor has announced a plan to boom business whereby $1,000,000 in prizes will be given to holders of coupons given with purchases from Chicago storekeepers who participate in the plan. The retail druggists' association has indorsed the plan, but other groups have thrown obstacles in its path. The opposition newspapers call it a "million dollar lottery." However, the corporation counsel and his staff have signed an opinion that the plan is legal. But, when the mayor sought to have three 60 ft. glass containers erected in Grant Park in which to place the duplicate coupons to be drawn out to determine the prize winners, the attorney for the south park board ruled that the whole plan was illegal and that the park board could not permit construction of the glass containers in Grant Park without becoming a party to the violation of the Illinois anti-lottery law. The postmaster notified the newspapers that the mayor's plan was illegal, hence any newspaper mentioning the particulars of the plan will be unmailable.

The mayor asked that Supt. William J. Bogan instruct the teachers that pupils send a letter to their parents, urging patronage at those stores which coöperate in the plan. Superintendent Bogan refused the mayor's request explaining that, while the schools have always been willing to coöperate in any legitimate way to relieve unemployment, stimulate business, and promote prosperity, this particular plan would be regarded by many as in conflict with the religious teachings of the pupils and contrary to the code of ethics of the teaching profession. Thereupon the mayor had his message printed and the pamphlets were handed out at the doors of all schools by policemen.

In his printed message, the Mayor attacked Superintendent Bogan. Most of the newspapers have upheld the superintendent of schools in the matter.

What Illinois needs is an inspired leader. Perhaps only a dictator could bring order out of the present taxation muddle. The following account should prove this:

For years the amount of taxes paid in Cook county was apparently a matter of subjective opinion in the minds of the members of the board of assessors and the board of review. Properties of identical value and situated in the same block had markedly different assessed valuations placed upon them. This was true on a very wide scale and the situation reached a climax in the 1928 annual assessment. So many protests were received against the 1928 assessment that the state tax commission declared it invalid and ordered a reassessment.

Thereupon, a multitude of citizens pinned their hopes on the reassessment. It proved a dismal disappointment. At one time when the reassessment seemed about to stop through lack of finances, loop bankers and other big-moneyed interests provided the funds to carry it through. When finally finished, it was discovered that $300,000,000 has been taken off the assessed valuations of loop property. Naturally this amount had to be spread elsewhere—on the small properties in outlying sections. It was not done directly and immediately. The total valuations were lowered, so that outlying properties were not increased materially at the time

(Concluded on Page 116)

CLEAN AIR INCREASED DULUTH'S SCHOOL ATTENDANCE

Another example of the economies of filtered air—reduced heating, cleaning and redecorating costs and improved health conditions in Duluth public schools.

In the Endion School, typical of the entire group, the effects, determined in a survey by the A. C. Nielsen Company, Engineers, were: (1) *Fuel Saving:* An annual saving of $714.00 in fuel cost, attributable principally to recirculation made possible by air filtration. (2) *Labor Saving:* A 75% reduction in cleaning requirements. (3) *Redecoration:* A probable extension of the period between inside redecoration from 3 to 4 years—saving $105.00 per year. (4) *Improved Hygienic Conditions:* A decrease of 13.8% in absenteeism, due wholly to air filtration and humidity control since there were no epidemics during either period under consideration.

American Air Filters protect health, reduce heating costs, save redecorating expense, prevent stock losses, control molds and bacteria, collect dangerous or valuable dusts, insure cleanliness of product, protect electrical machinery and prolong life of Diesel engines and air compressors. Fully described in literature which we will be glad to send you. Fill in and mail the coupon or write for full details to our Engineering Department. No charge. No obligation.

AMERICAN AIR FILTERS

COMBINING THE PRODUCTS FORMERLY MANUFACTURED UNDER THE FOLLOWING TRADE MARKS:

MIDWEST TRADE MARK Reed Air TRADE MARK filters NATIONAL AIR FILTERS TRADE MARK

Wherever the Public Gathers

In stores, theatres, hotels, auditoriums, etc., American Air Filters safeguard health, increase personal efficiency, reduce property depreciation, lower maintenance costs. Among prominent retail store users are Titche-Goettinger, Dallas (pictured above); Wanamaker's; Gimbel's; Macy's; Hudson's; Carson, Pirie & Scott; Strawbridge-Clothier.

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Use in which interested_____

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A Few Other Schools and Colleges Using American Air Filters

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HOLY CROSS SCHOOL
Worcester, Mass.
JUNIOR HIGH SCHOOL
New Castle, Pa.
LAFAYETTE COLLEGE
Easton, Pa.
LINCOLN HIGH SCHOOL
Milwaukee, Wis.
MASS. INST. OF TECH.
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NEW YORK UNIVERSITY
New York City
OHIO STATE UNIVERSITY
Columbus, Ohio
PROVIDENCE HIGH SCHOOL
Chicago, Illinois
ROOSEVELT HIGH SCHOOL
San Francisco, Calif.
STATE NORMAL SCHOOL
Jersey City, N. J.
UNIVERSITY OF CALIF.
Oakland, Calif.
UNIVERSITY OF CHICAGO
Chicago, Illinois
UNIVERSITY OF CINCINNATI
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The selection of American Air Filters by schools and colleges that have unlimited access to scientific and hygienic counsel, is proof of the benefits and economies of clean, germ-free, filtered air.

I dont know much —

. . . about school wardrobes, swinging blackboards, removable—non-removable coat hangers, door locker compartments, the combination teacher's rest room, bookcase and wardrobe, umbrella containers, etc., but have hopes that some day I may, as I have been earnestly creating and studying these items for some 12 years. I have had many conferences with school people, architects, and school board members and have tried to inculcate their practical ideas into these articles. This I have done with fair success! Other manufacturers of more brilliant minds feel they are able to master all these details in a year or less and don't hesitate to tell you how they do it. "Sort of" digressing from what I started out to tell you—but here it is: I have a new catalog Number 2 and it's yours for the asking, provided you promise not to put it in the waste paper basket for keeps.

PRES.

PROSE-MACO MANUFACTURING CO.
KANSAS CITY, MO.

Formerly The Progressive School Equipment Manufacturing Company

(Concluded from Page 114)

With this reduced total of assessed valuations, there was insufficient revenue from taxation to run the schools and other local governments, so it was imperative that the tax rates should be raised the next year. This was done. Now the outlying small property-owners are feeling the effects. The 1929 assessment has been completed, and objections to the assessments have been filed in behalf of 150,000 pieces of property in Cook county. This is four times the amount of objection raised against the so-called inequitable 1928 tax assessment which was thrown out. One half of all the real estate in Cook county has filed objections to the 1929 tax assessment.

Real estate owners, home owners, and teachers had hoped that the way out of the muddle would be obtained through an amendment of the state constitution, making possible an income tax in the state. Real estate now bears 85 per cent of the taxation burden in the state, while personality practically escapes taxation. Home owners and real estate men are desperate over the situation, and the teachers of Chicago feel that they are underpaid and overloaded. A dozen smaller cities pay their teachers a better wage and have a smaller teaching load. The teachers concentrated on the referendum to amend the constitution, to pave the way for the enactment of a state income-tax law. The manufacturers' association, the newspapers, the big-business interests, and some of the political factions took a stand against the amendment. The big-business interests in the city fought it because they did not want to contribute 15 per cent of the proceeds of Cook county taxes raised under an income tax to downstate; the state agricultural association opposed it because they did not want so small an amount as 15 per cent apportioned to downstate needs. Organizations of teachers and real estate men worked hard for its passage. Despite widespread propaganda by the press, it carried a large number of votes, but lost because of a provision in the law which required a majority of all the votes cast for the office polling the largest number of votes. Now, they are back where they started from three years ago; only worse. No adequate income tax is possible. A heavier burden than before is placed on the home owners and real estate, and only big-business valuations in the loop are reduced. The "overload underpay" situation is fastened more firmly than ever on the schools.

Some facts about unit school costs in the Chicago schools: Current expenses in 1929 amounted to $112.04 per pupil in membership, $16.03 per capita of city population, and $5.37 per $1,000 of full cash value of Chicago property. The total 1929 school costs, including expenditures on capital outlay and debt service, were: $145.11 per pupil in membership, $20.76 per capita of city population, and $6.95 per $1,000 of market value of property. Chicago school costs have uniformly been less than those of other large cities.

Following are the 1929 school expenditures classified according to function:

Function	*Amount*	*Per Cent of Total*
Administration	$ 2,171,464.16	4.10
Instruction	38,101,351.07	71.98
Coördinate activities	247,032.78	.46
Auxiliary agencies	1,733,329.98	3.27
Operation of plant	7,474,685.50	14.12
Maintenance of plant	2,531,189.83	4.79
Fixed charges	680,109.71	1.28
Total operating expense	$52,939,163.03	100.00
Capital outlay	11,284,955.64	
Debt service	4,339,932.27	
Total 1929 expense	$68,564,050.94	

It is always "open season" on school property in Chicago. The latest evidence of this is the senior-high-school site in Norwood Park. The school board had acquired a splendid site, with considerable natural beauty, on which it was intended to locate a senior high school. In all the years that it was privately owned, the property was not molested. As soon as the school board received title, the neighbors started to cut down the trees for fuel. More than twenty fine trees had been cut down before the school authorities stopped it. On other sites, black dirt was carried away in truckloads.

Three junior-high-school buildings which would not have been built for two years or more, are to be built immediately to relieve the unemployment situation. The architect has asked for bids on the Verdi Junior High School, a 2,250-pupil-capacity structure. The Galileo and Rembrandt Junior High Schools will be 1,600-pupil-capacity buildings. These three buildings are needed to relieve the seating shortage, but the fact that building prices are favorable now, and that construction will provide work for the unemployed, has led to the starting of these projects.

PERSONAL NEWS OF SUPERINTENDENTS

♦ Mr. John Mitchell has been elected superintendent of schools at Eaton, Ohio, to succeed the late John O'Leary.

Personal News of Superintendents

♦ Mr. Frederick W. Orth has been appointed as principal of the University Elementary School at the University of California, Berkeley. Mr. Orth succeeds Dr. A. J. Hamilton, who resigned after six years of service.

♦ Mr. William J. Lindell, superintendent of the schools of the second supervisory district of Jefferson county, New York, is now engaged in his fiftieth year of active school service.

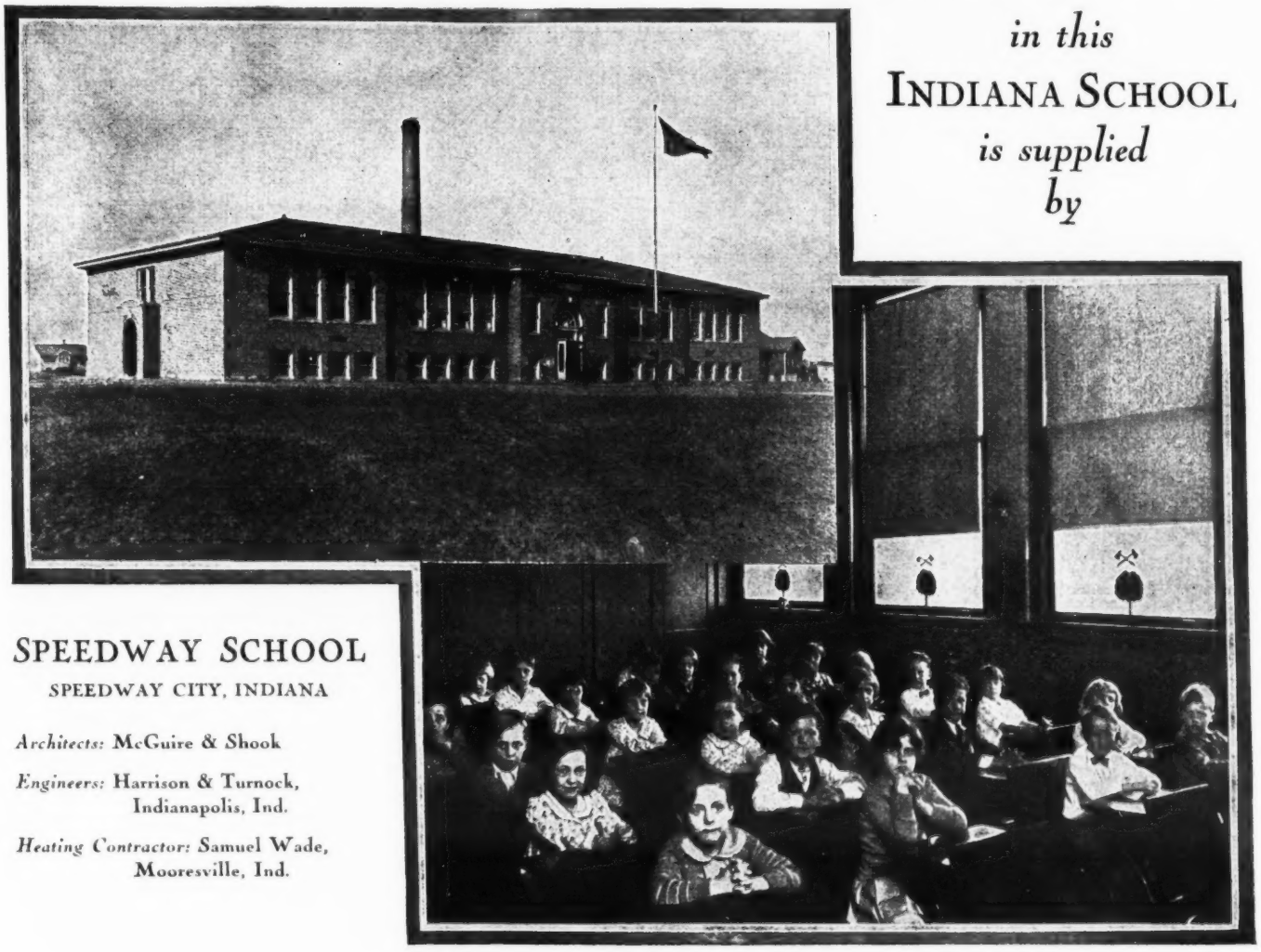
♦ Dr. Harlan H. Horner has been appointed director of college education for state education department of New York.

♦ Mr. E. L. Moyer has taken up his duties as principal of the high school at Galesburg, Ill. Mr. Moyer succeeds A. G. Umbreit, who is now at the University of Iowa.

BUCKEYE Heatovent

MODERN VENTILATION

in this
INDIANA SCHOOL
is supplied by



SPEEDWAY SCHOOL
SPEEDWAY CITY, INDIANA

Architects: McGuire & Shook

Engineers: Harrison & Turnock, Indianapolis, Ind.

Heating Contractor: Samuel Wade, Mooresville, Ind.

THE BUCKEYE HEATOVENT SYSTEM of Unit Heating and Ventilating

Fresh air, warmed to a comfortable temperature and diffused without draft helps to keep these children healthy in body and alert in mind.

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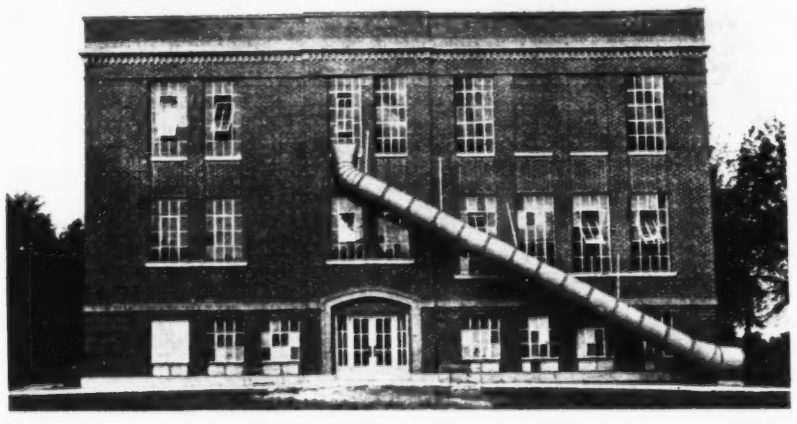
RESCUE 120 CHILDREN PER MINUTE FROM BUTLER

FIRE SMOKE, GASES AND PANIC

TUBULAR FIRE ESCAPE



Pictured above is the public school at Kellerton, Iowa. It is of fire-proof construction. Yet the school board officials responsible for the safety of Kellerton school children realized that no matter how well they might build, the possibility of fire is always present. True, modern construction lessens the hazard of fire. Nevertheless an average of six schools suffer serious fires every day. Authentic statistics show that 80% of school fires start in the basement. Contents of school buildings cannot be fireproof. Fire itself may never get beyond the basement and still perish or cripple scores of school children through smoke suffocation, gassing, and what is worst of all, PANIC, which crushes and tramples more victims than actually burn — even where the stairway type of fire escape is relied upon.

Through the Butler Tubular Fire Escape, 120 children can slide to safety and do it safely because they are protected all the way from smoke, flames and gases. Ice and snow cannot block their escape. The pressure of a child's foot on the treadle of the exit swings the doors wide open. Children or grown-ups swing into the mouth of the tube from the handy bars at the top and sides of the door. These patented features are to be had only in the Butler Tubular Fire Escape. Can you be conscience free until you have investigated the safest and most rapid escapeway for your buildings?

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SUPER SEPTIC
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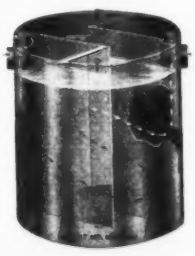
No chemicals. Nature's own process is harnessed to completely dispose of sewage. Sizes in both vertical and horizontal types for all schools. Write for complete information.



Send for complete information *now*.

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Send complete information about the Butler Tubular Fire Escape and about your free survey service. ☐ Check here if information on super-septic sewage disposal is desired.

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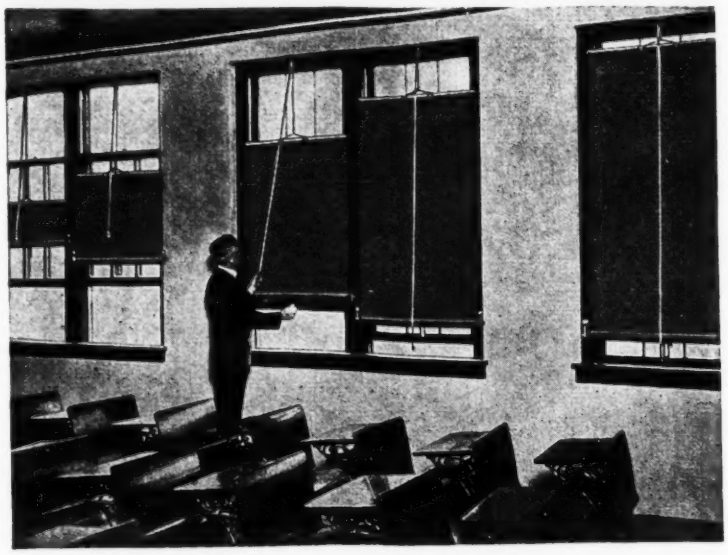

With Draper Adjustable Shades

"Eyestrain in children is due largely to bad lighting in schoolrooms," says a recent bulletin published by the United States Bureau of Education. "The primary function of a window shade is to exclude *excessive* light and *glare*. *The only satisfactory device is the adjustable fixture whereby any desired part of the window may be covered.*"

The Draper Adjustable Shade, which obstructs glare and permits entrance of valuable top light, is the logical answer to the specifications laid down by the Bureau of Education. Also, with Draper Shades, windows may be lowered from the top so as to permit an overhead circulation of air, *without draft*.

Use our free planning service.

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IDEAL
The Glass Ventilator

FOR THE SCHOOLROOM OR OFFICE

The health of the child of today is the most important factor in the success of the man of tomorrow. It is criminal to coop up a child in a stuffy classroom for hours without a breath of fresh air.

Ideal Ventilators have been adopted by hundreds of schools throughout America because they assure plenty of fresh air without a draught.

Write for complete information.

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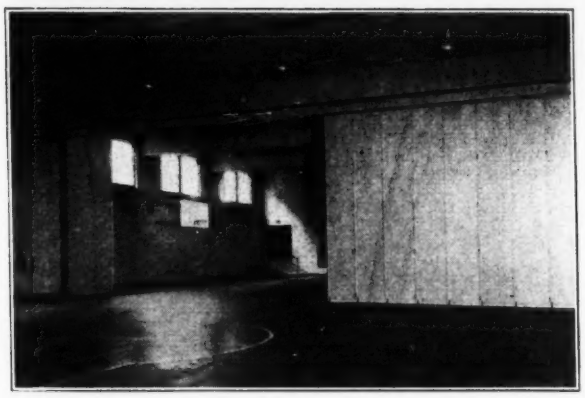
BUSINESS IS GOOD!

"Goodwill is the disposition of the customer to return to the place where he has been served well." Constant repeat business from Architects, because of the great number of satisfactory installations, has made this the greatest year in the history of

HORN FOLDING PARTITIONS

A list of Horn installations would read like an honor roll of 1930's fine educational buildings.



ANOTHER LARGE *HORN* INSTALLATION. NOTE THE MECHANICAL OPERATING DEVICE AT THE LEFT OF PICTURE.

Concordia High School and Clifford B. Connelley School, featured in this issue, have similar large HORN installations. Electrical operation and soundproof qualities make HORN PARTITIONS the one outstanding choice.

ALL HORN FOLDING PARTITIONS are mechanically operated—motor or hand controlled. They are soundproof and need no floor track. A complete HORN installation includes freight, erection, and a five-year guarantee. In HORN PARTITIONS you receive the advantage of years of research and experimental work.

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FORT DODGE, IOWA

REPRESENTATIVES IN ALL PRINCIPAL CITIES

FRANK B. COOPER PASSES AWAY

One of the most popular and successful educators on the Pacific Coast, Frank B. Cooper, former superintendent of schools of Seattle, Wash., has passed to the beyond. He died at his home in Lake Forest Park, Seattle, on November 23, after a brief illness, at the age of 75 years.

Mr. Cooper who was a graduate of Cornell University, Ithaca, New York, early won his way to high ranks in educational circles. Before going to Seattle, he served as professor of education at the University of Iowa. He was superintendent of schools at LeMars, Iowa, for seven years, at Des Moines, for eight years, and at Salt Lake City for three years.

At Seattle, Mr. Cooper made his greatest contribution to the cause of education. During the period of his service, the grade-school attendance increased fivefold and the high-school attendance fourteenfold. He held to the highest ideals, the best thought in educational method, and the most-approved policies in administration. He was particularly capable as a leader in all school activities and in the cause of popular education as he saw it. During the period when retrenchment in the cost of the schools struck some of the western cities, Mr. Cooper remained strong and calm, awaiting the return to reason and reflection. He held that the integrity of the schools must be maintained and that he must not subject the schools to a policy of retrogression and decline. He retired from the Seattle superintendency in August, 1922.

Mr. Cooper held the office of president of the National Education Association in 1907. He also served on the Washington-state board of education. He is survived by his wife, two sons, and two daughters.

PERSONAL NEWS

♦ MR. JOHN CAREY TAYLOR, formerly principal of the Poe Junior High School of New York City, has been named as assistant superintendent of schools at Baltimore, Md., succeeding John Coulbourn, who resigned.

♦ MR. H. M. CORNING, superintendent of schools at Colorado Springs, Colo., has become a member of the National Education Committee of the Porto Rico Child Feeding Committee. The committee is directing the work of feeding the undernourished and diseased school children of Porto Rico. A recent study by Dr. S. J. Crumbine, of the American Health Association, revealed that 201,000 children in the island suffer from malnutrition.

FRANK B. COOPER

♦ MR. JOHN O'LEARY, superintendent of schools at Eaton, Ohio, died on November 14 at his home, after a short illness. He had been connected with the schools for nearly 30 years and was well known in the state.

♦ MR. JAMES W. MCLANE, a former superintendent of schools at Cleveland Heights, Ohio, died on November 28, at Tucson, Ariz. Mr. McLane was a graduate of Western Reserve University. He resigned from the superintendency at Cleveland Heights seven years ago to devote his time to literary work and travel.

♦ MR. D. E. PHILLIPS has been elected superintendent of schools at Davenport, Wash., to succeed L. D. Baker.

♦ MR. L. M. DIMMIT, of King county, Wash., has been appointed state-high-school inspector in Washington, to succeed Edwin Twitmeyer. MR. L. D. BAKER, of Davenport, has been named as principal of the high school in King county, succeeding Mr. Dimmit.

♦ MR. CHARLES T. ANDREWS, a prominent educator of New York state, died at his home in Dundee, Yates county, at the age of 89.

Mr. Andrews began his educational career as a principal at Watkins Glen, N. Y. Later, he was principal at Owatonna, Minn., Seneca Falls, N. Y., and head of the schools of Schuyler county. He was supervisor of state schools in the New York State Education Department, where for a number of years he had charge of administrative problems of normal schools, Indian, and other special state schools. Throughout his life, Mr. Andrews was a journalist. He was an editorial writer and associate editor, which work he continued until he was 80 years old.

HARRIS UNIT-BUILT SCHOOLS

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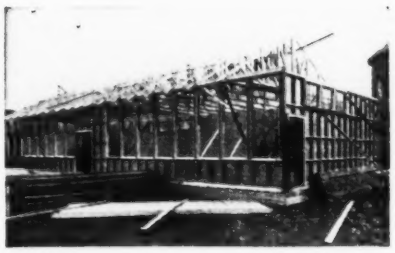

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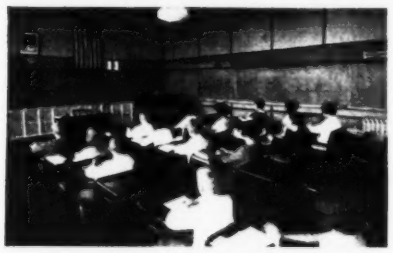
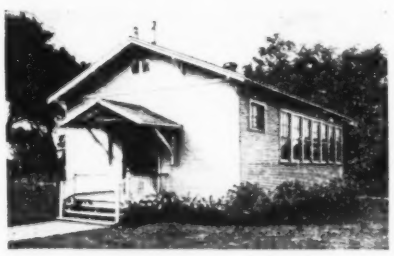
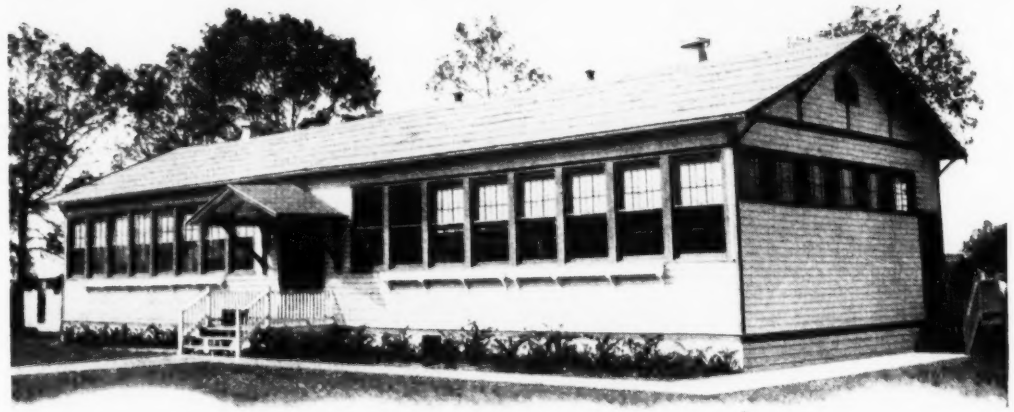


Snug, Light and Well Ventilated Classrooms



Schools in All Sizes to Meet Every Community Need



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Designed and manufactured by America's largest producers of sectional buildings, an organization foremost in the Building and building material industry for over 35 years. Embracing all the requirements of a modern building—correct light, perfect ventilation, sanitation, and safe construction are all an integral part of every Harris School, yet they are low in cost.
Our Standard Designs accommodate 40 to 400 pupils and offer the most satisfactory solution of your housing problem in the most economical way.

BUILT TO DEFY SUB-ZERO WEATHER

Harris "Unit-Built" School Buildings offer complete insulation against winter's icy blasts. They have double roofing, double floors with insulation between, and double wall insulation.
Underneath the siding on all Harris "Unit-Built" Schools is an insulator. Under the inside lining is our own exclusive product—"Cellu-Seal" insulator lining, guaranteed to give 33⅓% more insulation than the usual type of construction.

HARRIS BROTHERS CO.

NEW YORK 1349-1525 West 35th Street, CHICAGO, ILL. **DETROIT**

THE CELORON SCHOOL, CELORON, NEW YORK

(Concluded from Page 82)

which accommodates the heating and ventilating apparatus. The building is heated by a vacuum vapor system with automatic thermostatic control, and unit ventilators in each classroom.

The exterior of the building is designed in the Georgian style, with limestone trim, and variegated red-brick walls. The outer walls are backed with tile and the inner walls are of load-bearing tile. The bearing floors and stairs throughout are concrete.

The building was completed at a cost of $173,476.61.

THE CONNELLEY TRADE SCHOOL FOR BOYS

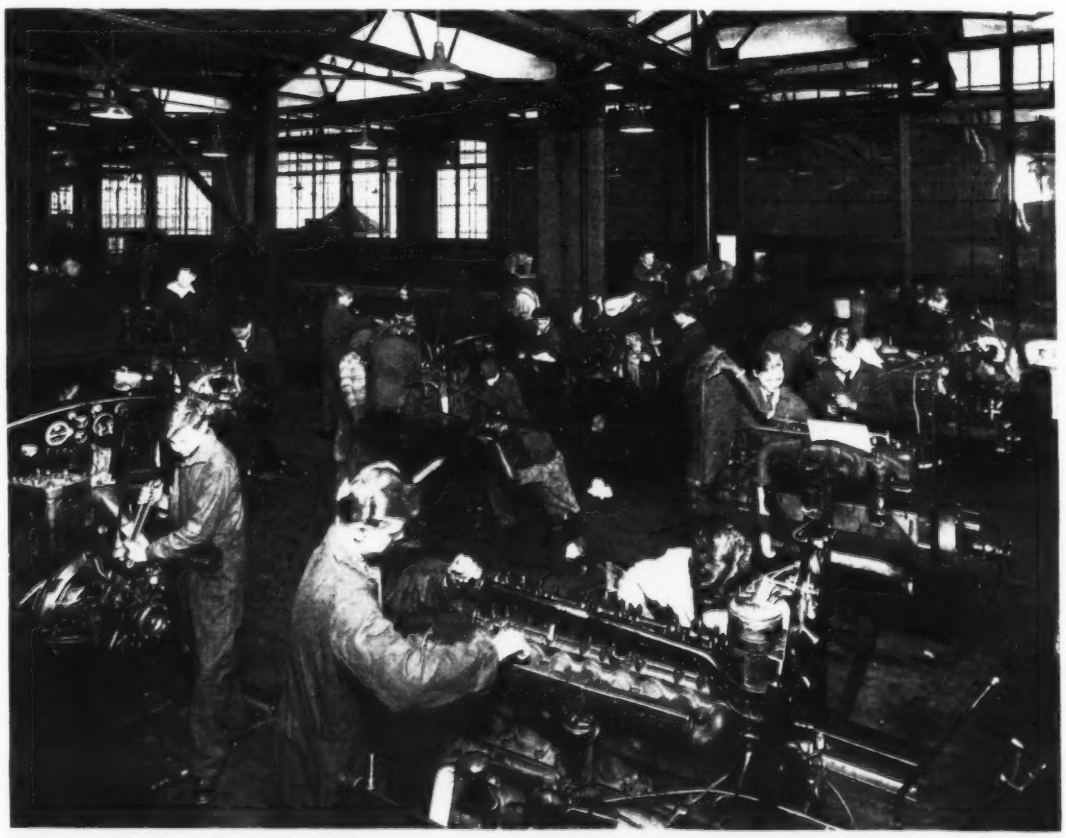
(Concluded from Page 45)

1 Auditorium (Capacity, 830)
1 Gymnasium and Locker room
1 Swimming Pool and Locker Room
1 Library
7 Drafting Rooms
1 Blue-Print Room
5 Lecture Rooms
1 Commercial-Art Room
1 Pressroom
1 Composing Room
1 Bindery Room
1 Mimeograph Room
1 General-Science Room
1 Chemistry and Physics Laboratory
1 General-Science Laboratory
1 Cafeteria (Capacity, 500)
1 Receiving Room
1 Book-Storage Room
6 General Toilet Rooms
1 Foundry
1 Auto-Mechanics Dept.
1 Auto-Mechanics Shop
1 Auto-Electric Shop
1 Auto-Service Shop
1 Carpentry Shop
1 Cabinet Shop
1 Millroom
1 Pattern Shop
1 Wood-Finishing Shop
1 Lumber-Storage Room
1 Surface-Wiring Shop
1 Concealed-Wiring Shop
1 Electrical Laboratory
1 Telephone and Radio Shop
1 Power and Equipment Shop
1 Exhibit Room
1 Demonstration Room
2 Shower and Toilet Rooms
1 Custodian's Room
1 Boiler Room

The main front of the classroom building is in classic style, developed in brick and limestone. The shop portion has been held strictly in factory style. The construction throughout is steel and concrete, and wholly fireproof. The academic building measures 263 by 119 feet and the shop building is 248 feet deep and 232 feet wide. The building contains 3,900,000 cubic feet of space. The total cost was $1,777,081, including building and equipment. For the building alone, the cost was 33.53 cents per cubic foot.

The building was planned by Mr. Edward B. Lee, architect. The engineering was done by C. L. Wooldridge, Inc. The original layout was prepared by Mr. James Bonar, and the building was erected under the supervision of the building department of the Pittsburgh schools, of which Mr. Bonar is superintendent, Mr. G. P. Ellis, assistant superintendent, and Mr. C. B. Allison, assistant superintendent.

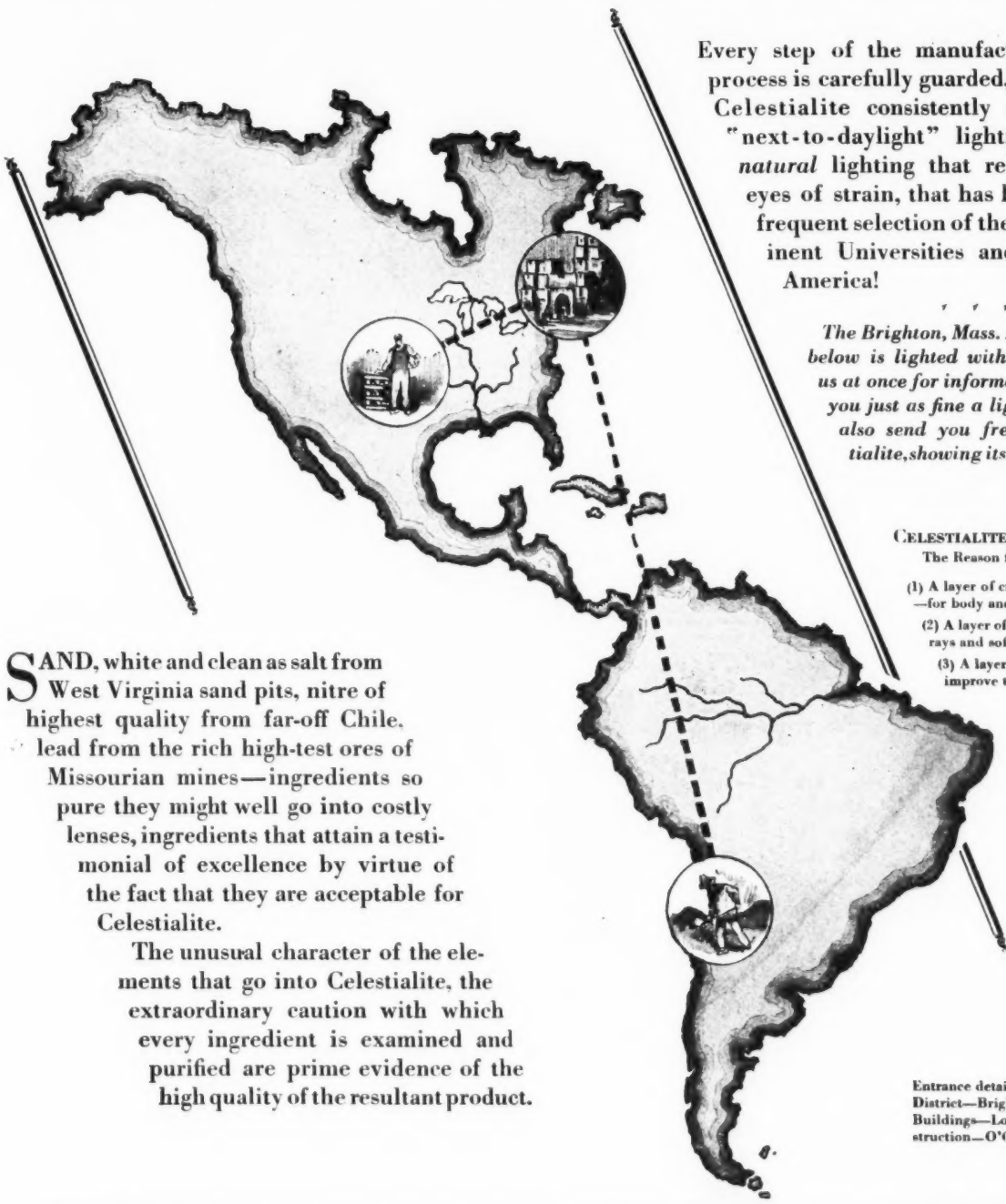
The contract for the building was let on May 23, 1928, and the building was finally accepted in the summer of 1930.



AUTO MECHANICS SHOP, CLIFFORD B. CONNELLEY TRADE SCHOOL, PITTSBURGH, PENNSYLVANIA.
Edward B. Lee, Architect, Pittsburgh, Pennsylvania.

INGREDIENTS

the finest from home and abroad to light this Massachusetts School



Every step of the manufacturing process is carefully guarded, so that Celestialite consistently supplies "next-to-daylight" lighting — the *natural* lighting that relieves the eyes of strain, that has become the frequent selection of the most prominent Universities and schools in America!

* * *

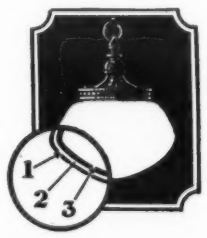
The Brighton, Mass. High School shown below is lighted with Celestialite. Write us at once for information that will secure you just as fine a lighting system. We will also send you free, a section of Celestialite, showing its three-layer construction.

CELESTIALITE'S *three layers:*
The Reason for Its Superiority

(1) A layer of crystal clear transparency —for body and strength.

(2) A layer of white glass—to diffuse the rays and soften the light.

(3) A layer of blue glass—to whiten and improve the quality of the light.



SAND, white and clean as salt from West Virginia sand pits, nitre of highest quality from far-off Chile, lead from the rich high-test ores of Missourian mines—ingredients so pure they might well go into costly lenses, ingredients that attain a testimonial of excellence by virtue of the fact that they are acceptable for Celestialite.

The unusual character of the elements that go into Celestialite, the extraordinary caution with which every ingredient is examined and purified are prime evidence of the high quality of the resultant product.

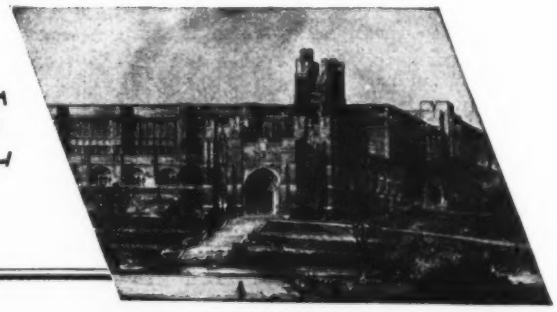
Entrance detail of High School—Bennett District—Brighton, Mass.—Dept. School Buildings—Louis K. Rourke, Supt. Construction—O'Connell & Shaw, Architects.

Gleason-Tiebout Glass Company
200 Fifth Ave., New York

CELESTIALITE

(Registered and Patented)

"NEXT TO DAYLIGHT"



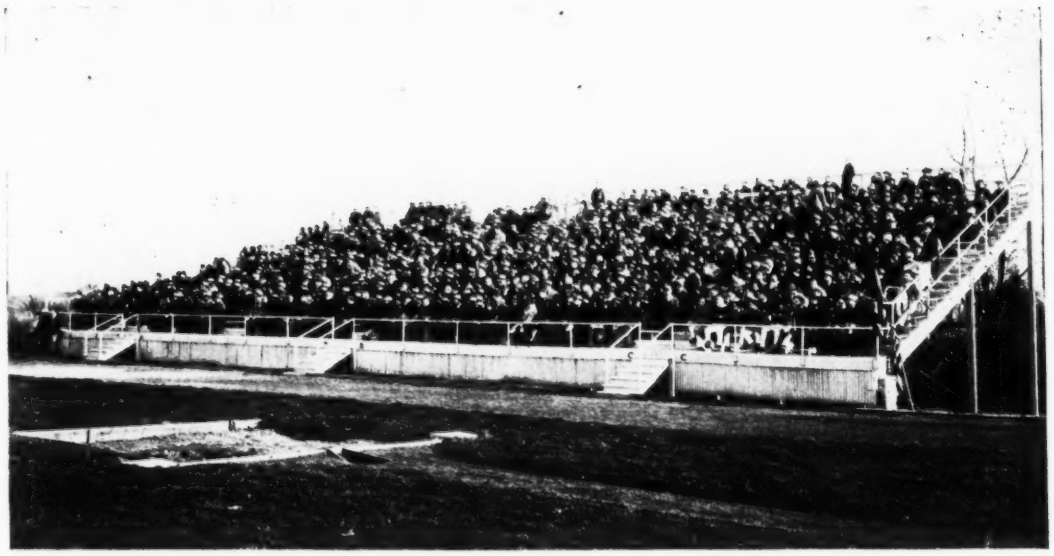
PITTSBURGH DES MOINES

Provides Maximum Capacity with Low Cost and Safety

The PITTSBURGH-DES MOINES all-steel grandstand is a structure incomparable in safety, appearance, and low initial and maintenance costs. Its advantages are unlimited.

Trained engineers and erection crews guarantee first class jobs and complete satisfaction to any purchaser of the PITTSBURGH - DES MOINES grandstand.

Two shops, one in Pittsburgh, Pa., and another in Des Moines, Iowa, are equipped with all the facilities necessary to turn out first class work. Competent and experienced hands carry any grandstand job from start to finish.



A Pittsburgh-Des Moines Grandstand at Ursinus College, Collegeville, Pa. Capacity 1440 persons.

PDM Grandstands are built in standard sections, which can be added to or double decked as required. The clear space beneath the stand may serve as offices or storage and dressing rooms. Comfortable wooden seats raised on steel supports give ample leg and foot room.

Further information on our all-steel grandstands is given in our free folder No. 87

Pittsburgh-Des Moines Steel Company

3489 Neville Island, Pittsburgh, Pa. 991 Tuttle St., Des Moines, Ia.
693 Hudson Terminal Bldg., New York, N. Y.

SCHOOL ADMINISTRATION NOTES

NEW LONDON BOARD REORGANIZES ADMINISTRATION

With the opening of the new school year, a reorganization of the school board of New London, Conn., has been effected, with the purpose of bringing the several members of the school board and the school management into closer contact.

Under the new plan, the board is divided into three standing committees. These include a committee of three, to be known as the committee on the budget and personnel; a committee of three, to be known as the committee on curriculum and textbooks; and a committee of three, to be known as the committee on health, recreation, and physical education. Each of the committees which is to be a fact-finding committee, will serve in an advisory capacity to the board, and will enjoy only such powers as may be conferred upon it by the board from time to time. The superintendent of schools and the secretary of the school board coöperate fully with each of the committees in the performance of their duties and responsibilities.

The change was made to effect a close and direct contact on the part of the members of the board with the details of management of the schools as provided under the city charter, and sought to bring about a general improvement in the efficiency of the administration of the local school system. In giving the respective members of the board specific duties to perform in connection with the school administration, it was believed that each member would be better informed on matters connected with the work of the several committees.

ACHIEVEMENT TEST AT GREAT FALLS, MONT.

Under the direction of Mr. E. N. Tisdale, director of guidance work in the high school, achievement tests for students have been inaugurated at Great Falls, Mont., as a substitute for the former semester examinations. It is believed the new plan will save both time and money. The cost for giving the tests is about 7 cents per pupil, which is not as much as the cost for semester examinations.

Under the plan, standard tests are used for determining the pupil's knowledge in the respective subjects. The result of the tests are carefully studied to discover the particular difficulties and needs of each pupil. Then the work of the class and the assignments to each pupil are worked out in the light of the results of the tests.

Near the middle of the second semester, a standard follow-up test is given each pupil, to determine if the needs disclosed by the first test have been adequately met by the teacher and pupils. Even then, it is not too late for further corrective measures before the end of the school year.

The testing and guidance programs are to go hand in hand. The fixed purpose of each is to give every individual child all necessary assistance in realizing his greatest possibilities for happy, useful service in life. It is believed that only in this way can the schools make a start toward providing for every child genuine equality of opportunity. It has been recognized that a scientific diagnosis of capacities and possibilities is the only way in which the nation's ideals may be realized.

DENVER SCHOOLS REPORT REDUCTION IN RETARDATION

A recent report of the administrative department of the school system of Denver, Colo., shows that during the four-year period of 1925–1929, there has been a decrease of 7.9 per cent in overageness in the elementary schools. In the junior high schools there was a decrease of 6.6 per cent, and in the senior high schools there was a slight gain of 1.1 per cent.

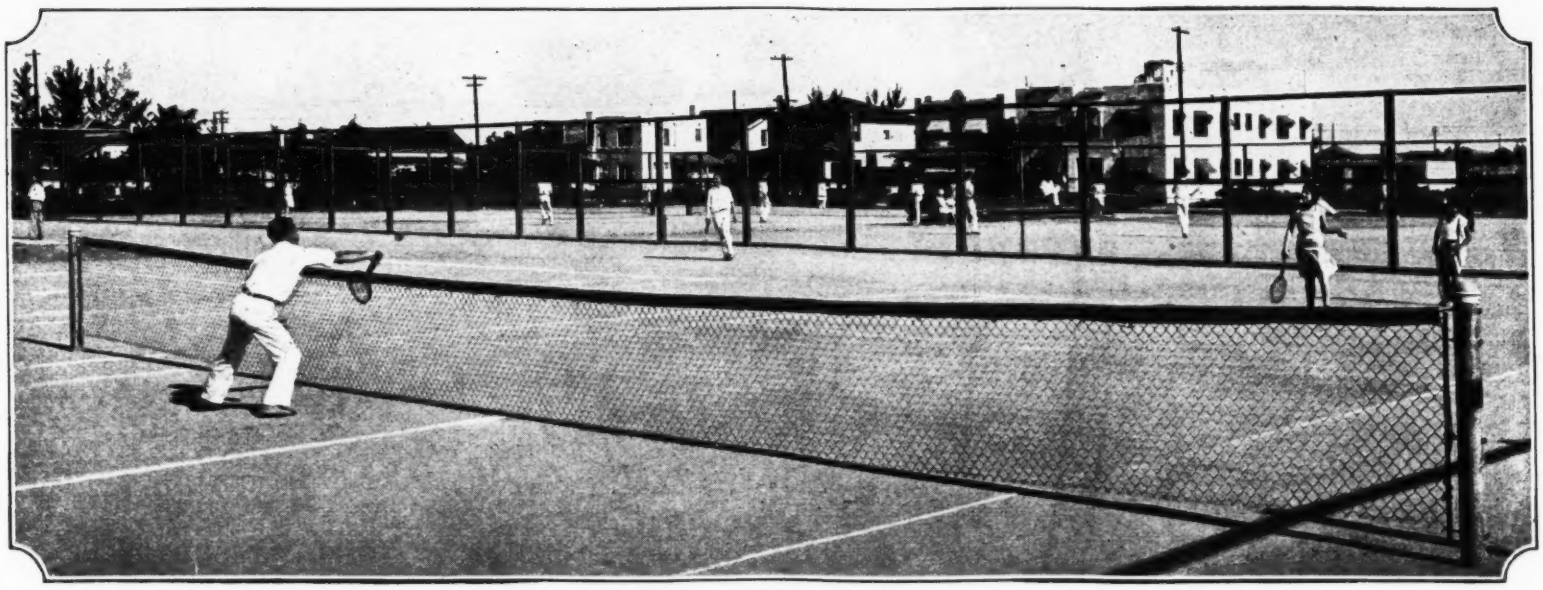
The standard for the normal age of any pupil is based on the fact that pupils enter Grade 1B between the ages of 6 and 6½ years. Thus, a pupil entering Grade 2B should be between 7 and 7½ years; one entering Grade 3B should be between 8 and 8½ years, and so on, through the twelve grades of the public schools.

The reduction of overageness has been accompanied by a corresponding increase in the percentage of pupils of normal age and under age. Reductions in the percentage of overageness and increase in the percentage of normal age and underage pupils must necessarily be accompanied by a decrease in school costs and a general increase in efficiency.

A number of factors have been held responsible for the reduction of overageness in the elementary schools. General improvement in teaching and in methods of supervision, classification of pupils according to mental ability, development of the testing program, and more careful assignment of teachers have all had a part in effecting the desired results.

Underageness in the elementary school has had a tendency to reduce. This has been due to the fact that special promotions are now only rarely given. A few years ago a superior pupil might have been advanced because of his ability to do work ahead of his grade. Today, the classification program groups all the exceptional children of a given grade into one section, and provides work suited to their ability instead of pushing them on to an advanced grade. Thus, the superior pupil is likely to remain as a member of a special section of his own grade throughout the period of the elementary school. The result, is, of course, a decrease in the percentage of underageness.

Announcing a New and Vastly Improved



AMERICAN CHAIN LINK

STEEL WIRE TENNIS NET

(Patent Applied For)

Further Evidence of Its Practicability

Many letters have been quoted in our advertising in the past few months. Here are additional letters:

"It gives us much pleasure and satisfaction," writes the Park Superintendent of a city in Iowa, "to advise you that the six tennis nets purchased from you have fulfilled our every expectation.

"Their rugged construction and consequent freedom from requiring repairs make them highly desirable from an economic standpoint.

"We have received many compliments on the excellent condition of our courts and we attribute this largely to the use of your nets and strongly recommend same to anyone needing such equipment."

The Mayor of an Ohio city writes: "I have heard no complaints, but have heard some favorable expressions . . . so that I plan to make additional installations by next year's tennis season."

The Purchasing Agent in one of California's most prominent cities wrote us: "Our Superintendent of Parks states that the nets have been very satisfactory to the players and he feels assured that they will prove to be economical in use. We will undoubtedly standardize on this type of net."

From a well known preparatory school in Indiana: "We have no criticisms to offer with reference to this net . . . in fact it has served its purpose very well, and while the initial cost is somewhat higher than the cotton net, there should be very little expense as far as renewal or upkeep is concerned."

These Advantages Explain the Nation-wide Demand for the American Chain Link Tennis Net

- **Amazingly low in cost . . . where years of service are considered**
- **Embodies every advantage of the very finest cord net, and has many advantages that cord nets do not possess**
- **Installation is permanent . . . although posts and nets can be furnished for removal in Winter months, where desired**
- **Eliminates daily erection and removal . . . an item of considerable expense for labor and trucks**
- **Not affected by rain, snow, sleet, heat, violent changes in atmospheric conditions, or salt air**
- **No upkeep or maintenance cost . . . outside of canvas strip**
- **Height never varies . . . a fact appreciated by tennis players**
- **No reel to bother with; net does not tear or wrap**
- **Beautifies materially the tennis court itself**
- **Tests prove that net cannot and does not injure tennis ball**
- **Preferred by tennis players, who will wait to play upon a court with an American Chain Link Tennis Net rather than play upon an empty court with a cord net**
- **More than pays for itself the very first year . . . in savings effected in maintenance and upkeep costs**
- **Lasts a lifetime . . . a permanent tennis net in every respect.**

Here is a permanent tennis net that solves problems facing every school official. It requires no maintenance . . . no upkeep . . . no repairing. It need never be taken down. Install it and forget it . . . for years and years. It is a time-saver, a labor-saver and a money-saver . . . and the savings effected by its use easily pay for the net itself within one year.

These are facts that have been very definitely and very decisively proven during the past year . . . by scores of installations made in more than 23 states. They are facts that account largely for the nation-wide popularity of the American Chain Link Tennis Net with leading schools throughout the country. Not a single installation made to date has been unsatisfactory. On the other hand, a number of officials have written us that this net is the most economical and practical net ever devised . . . and especially for use upon tennis courts of public, state and private schools and colleges.

Many trial installations of a half-dozen nets were made since the American Chain Link Tennis Net was first introduced some six months ago. The officials who authorized those "trial installations" have since equipped all their courts with our net, or have advised us that they would do so this Spring. Could you have any stronger testimonial of its economy and practicability?

A number of very practical improvements have been incorporated into the net since it was first placed on the market. The new net has won the approval and the endorsement of some of this country's keenest and most critical authorities . . . authorities not only upon the game of tennis itself but also upon the operation and maintenance of tennis courts.

It will pay you . . . if you are concerned with the operation and maintenance of tennis courts in public, state or private schools or colleges . . . to investigate this revolutionary steel wire tennis net. Do so! Write us at once for complete information.

American Wire Fence Company

7 South Dearborn Street *Tennis Net Division* **Chicago, Illinois**

A Few of the Many Installations in Schools

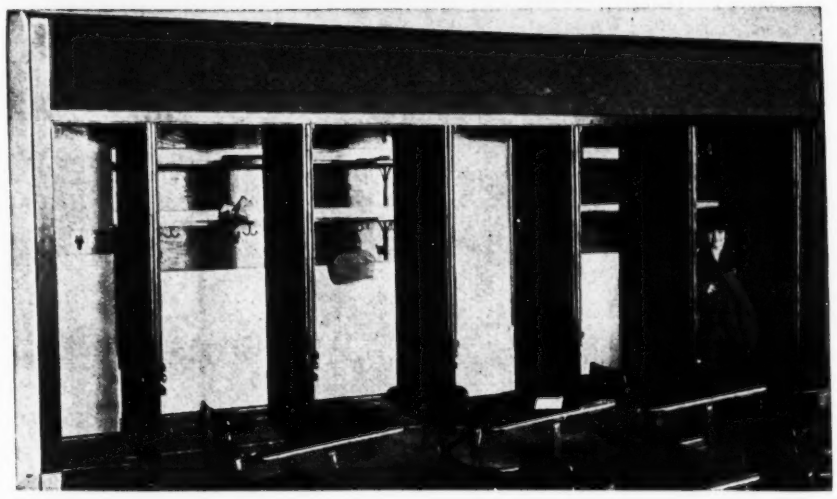
Connecticut College, Connecticut
University of Georgia, Athens, Ga.
Rosary College, River Forest, Ill.
Culver Military Academy, Culver, Ind.
Dana Hall School, Wellesley, Mass.
Allegheny College, Meadville, Pa.
State College, South Dakota
State College, Pullman, Wash.

A Few of the Many Installations in Public Parks

Birmingham, Ala. **Baltimore, Md.**
Los Angeles, Cal. **Minneapolis, Minn.**
Tampa, Fla. **Portland, Ore.**
Chicago, Ill. **Houston, Texas**
Oklahoma City, Okla.

Scores of other installations have been made during the past six months . . . by public and state schools, colleges and universities; public parks and playgrounds; tennis clubs; golf clubs; country clubs and private estates. Not one single case of dissatisfaction has arisen to date, while on the other hand a very large number of officials have written us expressing their complete satisfaction with the American Chain Link Tennis Net: its economy . . . its practicability . . . its popularity. If you have not yet done so, by all means send at once for complete information regarding the new and improved American Chain Link Tennis Net. Write today.

What a joy, teacher!



It's fun to help little tots with their overshoes and heavy coats when your room is equipped with a Miller wardrobe. Warmth and comfort mean a great deal to every teacher during the cold winter months especially, when under the old system children left their wraps in a chilly, foul-smelling cloakroom.

How different everything is, when your room is equipped with this new wardrobe! Its multiple-operating, single control system saves many steps, prevents petty pilfering, insures perfect ventilation in the schoolroom.

And the Miller is practical for not only new buildings but older schools as well. Every school has enough room for the Miller. Send today for the Miller wardrobe catalog.

The K-M Supply Company

119-123 West Eighth Street KANSAS CITY, MISSOURI

SCHOOL-ADMINISTRATION NOTES

♦ The largest single order for motion-picture sound-reproducing equipment has recently been awarded by the United States Navy to RCA Photophone, Inc., New York City, a subsidiary of the Radio Corporation of America.

The contract calls for the equipment of battleships, cruisers, destroyers, and a number of shore stations. The awarding of the contract comes at a time when every effort is being made to coöperate with the President's employment program and the work involves an expenditure of more than half a million dollars.

The order for this equipment has established a new high record for purchases of sound-reproducing equipment and marks the entry of sound on a large scale in the educational program of the navy. The experiment in educational talking pictures will be watched with interest by the educational institutions of the country.

♦ The citizens of Beverly Hills, Calif., have presented a petition with the state board of education, asking for an election to vote on the creation of an independent high-school district. Beverly Hills is at present a part of the Los Angeles high-school district.

The petition of the citizens called attention to the fact that a saving of $200,000 a year in taxes would be effected by the establishment of a separate school district.

♦ Miss Agnes Samuelson, state superintendent of public instruction for Iowa, in a recent bulletin, quotes Mr. W. H. Root, of the Iowa Highway Commission as follows: "The commission recommends that pedestrians walk on the left-hand side of the highway so that they face traffic on their side of the road. This is desirable in the case of school children who walk along the pavement in groups. By following the rule, the children can see approaching traffic in plenty of time to step to the side of the road, and let the traffic go by. They need not fear traffic from the rear because such traffic passes on the opposite side of the road."

♦ Miss Eliza Stickley, supervisor of rural schools in Princess Anne county, Maryland, recently inaugurated a program of using standard tests in all the elementary schools of Princess Anne county, with the idea of diagnosing the case of each individual child, and then follow this test with others at periods during the year to determine the progress of each. Particular emphasis was placed on the subject of reading.

Under the plan of procedure, each individual pupil was studied as a case, and helped accordingly by the teachers and supervisor. Together they interpreted the results; they noted the weaknesses and offered remedial instruction; they recognized good practices and encouraged them; and they discovered the individual needs and made satisfactory adjustments.

♦ The federal radio commissioner, Mr. Harold A. Lafount, has recently advocated the use of time over existing broadcasting stations, rather than the allocation of a specific portion of the wave lengths for educational stations, as the most effective way of introducing education by radio on a national scale. Mr. Lafount believes it unwise, both from the standpoint of the public and of education, to segregate radio education on particular channels. He declared he was opposed to the project of educational interests to obtain 15 per cent of all broadcasting facilities.

♦ The state education department of North Carolina has issued a report in which it is pointed out that 165,018 more children are in schools operating eight months or longer now, than there were in 1925–26. In 1925–26, there were 459,080 children, both white and colored, attending schools operating for eight months or more during the year. In 1929–30, there were 600,044, or 69.2 per cent of the total enrollment, attending schools having terms of eight months or more. Thus, over a period of five years, there has been an increase of 165,018, or an average annual increase of 33,003 pupils provided with schools having terms of eight months or more.

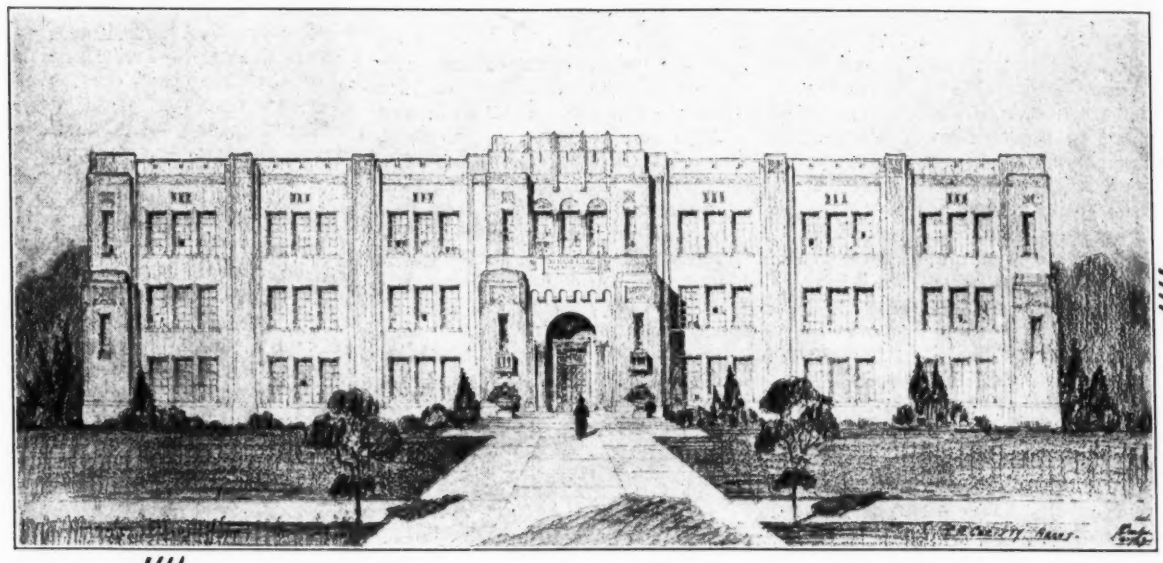
There were 266,895 children attending schools having terms of less than eight months, 236,706 of the number for six months, and 30,189 for seven months. In other words, 30.8 per cent of the total school enrollment are in schools having terms of less than eight months, and 69.2 per cent are in schools operating for eight or nine months.

♦ The state education department of North Carolina, in a recent report, offers information showing that the current operating expense of the public schools has increased from $4,215,178 in 1914–15, fourteen years ago, to $27,961,531 in 1928–29.

The report points out that the increased cost of education in the state is due to the increase in the cost of living, the decrease in the purchasing power of the dollar, and the increase in the kind, quantity, and quality of educational service.

It was shown that there are 250,000 more school children in the state today, than there were in 1914–15. The average school term has increased from 123 days in 1914–15 to 152.9 days in 1928–29. The number of students in high schools has increased from 16,783 in 1914–15 to 109,506 in 1928–29. More than a year has been added to the average training of North Carolina teachers within the past few years.

♦ New York, N. Y. The officials of the board of education have begun to administer the school-relief fund for needy children in the schools. The first efforts of the school authorities have been directed to obtaining shoes for children who need them to attend school. Within the past few weeks, 2,000 pairs of shoes have been distributed to district superintendents to give to needy children whose distress has been reported by teachers or principals. The total contributed by teachers to the relief fund was estimated at from $60,000 to $75,000.



Supervising Architect: E. A. Christy.

In the new Academic High School for Girls,

New Orleans, La.

In the beautiful new Academic High School for Girls, New Orleans, La., 14 new "SF" SANI-DRI Wall Model electric driers will be installed. The washrooms of this new school will thus have permanent sanitation and continuous drying service that is always available. The wall model SANI-DRI, with its positive automatic cut-off, not only "times" the length of the dry, but prevents waste of electric current. Both the wall model and the pedestal type SANI-DRI are fully mischief-proof, making either type ideal for school washroom service.

New "SF" Wall Model SANI-DRI with push button control and automatic cut-off.

Best from the standpoint of day-after-day trouble-free service, the new "SF" also costs less to operate than the cost of any comparable towel service. *Its actual economies over towels range from 60% to 90%!*

We invite inquiries from School Boards, School Superintendents or Business Managers regarding the advantages of the new "SF" SANI-DRI for school washroom use. Upon request, a copy of our booklet, "The Airway to Efficiency," will be forwarded promptly.

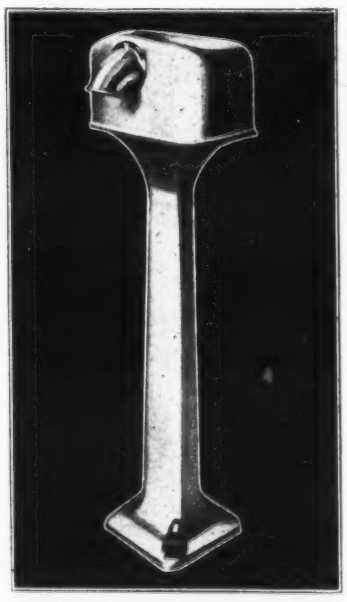
Electrical Division,

CHICAGO HARDWARE FOUNDRY CO.
North Chicago, Ill.

The New "SF" SANI-DRI

Made in a choice of Two Models

The New "SF" SANI-DRI is supplied in either wall or pedestal type. The former is easily attached to walls and is desirable where floor space must be kept clear. Both models are in genuine porcelain enamel, and each contains all of the twelve outstanding betterments to be found only in the new SANI-DRI.



New "SF" Pedestal Model SANI-DRI, operated by conveniently placed foot pedal.

Changing Bond Prices

Harold F. Clark, Ph. D., New York

Something has been happening to the price of industrial and railroad bonds. The *Commercial and Financial Chronicle,* in its issue of December 6, considers the situation in regard to bond prices as the first item of business importance. It goes on to say: "One of the most disquieting facts in the present financial situation is the depreciation which is taking place in the bond market, particularly in railroad bonds." The article goes on to point out the well-known fact that many railroad bonds have lost twenty or thirty points in the past sixty days. All of this has happened during a period when there has been plenty of money. As another authority has put the matter, "It is largely a case of the people being afraid to put their money even in bonds."

One, perhaps, would not be quite so sure now regarding the trend of prices in the immediate future. However, considering the amount of money that must be invested and the fact that the stock market may not take an excessive part of it, there should be a good market for bonds during the coming months. A further unsettling of business conditions, of course, might shake confidence so much that industrial and commercial bonds would decline even further, and carry municipal bonds down with them. If we assume that the business depression is fairly well toward the bottom and that slowly expanding business will not make an excessive demand on the money market, there would be good grounds for expecting better bond prices. All things considered, I believe this is a

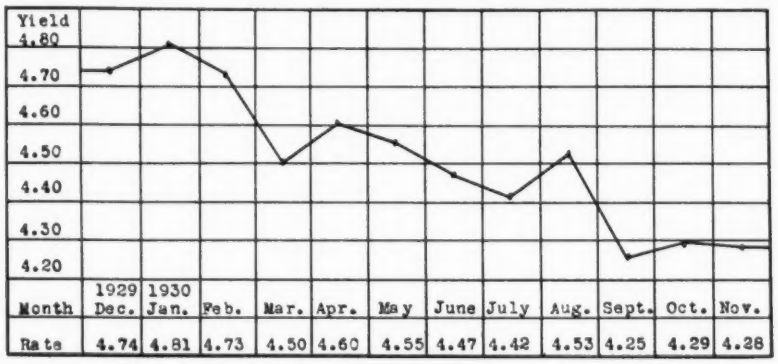


TABLE I. AVERAGE YIELD OF ALL SCHOOL BONDS SOLD DURING THE MONTH

When the Federal Government can announce a short-term note issue at rates of 1¾ per cent and 1⅞ per cent as was recently done, it shows conclusively, there is no scarcity of funds that might go into bonds. Incidently, it is worth remembering that this is a new low record for interest rates on short-term government securities. At the same time that short-term notes are selling at the best prices in years, the bond market is having difficulty. If a feeling of confidence returns in the business and industrial situation, there is no reason

TABLE II. Amount and Yield of Bond Issues

1. School bonds during the month[1] of November	$ 23,276,540
2. All municipal securities sold during the year (to date)	1,311,051,000
3. All school bonds outstanding (estimated)	3,273,000,000
4. Average yield of all school bonds outstanding (estimated)	4.64%
5. Yield of school bonds of ten large cities	4.30%
6. Yield of United States long-term bonds (Quotation the middle of December)	3.23%

[1]The monthly total of school bonds does not include all the bonds issued in the month, due to the difficulty of obtaining the yield on some of the issues.

why bond prices should not register very substantial gains. The action of the bond market during the past ninety days is a perfect demonstration of the fact that to sell school bonds under the best possible conditions demands the most careful watching of the bond market. Three months ago it seemed reasonably certain that school bonds could be sold most any time in the following months on a general declining interest basis. During that period there have been very short fluctuations in the net interest rates that would have to be paid on bond issues.

TABLE III. Bond Sales and Rates[1]

Year	*School*	*Municipal*	*All Public and Private*	*Year*	*Municipal*
1929	230*	1,432*	10,194*	1929	4.67*
1928	218	1,414	8,050	1928	4.45
1927	266	1,509	7,776	1927	4.49
1926	260	1,365	6,344	1926	4.61
1925	323	1,399	6,223	1925	4.58
1924	288	1,398	5,593	1924	4.26
1923	206	1,063	4,303	1923	4.76
1922	237	1,101	4,313	1922	4.81
1921	215	1,208	3,576	1921	5.18
1920	130	683	3,634	1920	5.12
1919	103	691	3,588	1919	5.04
1918	41	296	14,368	1918	4.90
1917	60	451	9,984	1917	4.58
1916	70	457	5,032	1916	4.18
1915	81	498	5,275	1915	4.58
1914	42	320	2,400	1914	4.38

[1]By special permission based upon sales reported by the Commercial and Financial Chronicle.
*Not final.

[1]Copyright by Harold F. Clark.

TABLE IV. Average Yield of Long-Term Federal Government Bonds[1]

Month	*Rate*	*Year*	*Rate %*
1930			
Dec.	3.32*		
Nov.	3.33*		
Oct.	3.34		
Sept.	3.37	1928	3.437
Aug.	3.38	1927	3.464
July	3.37	1926	3.544
June	3.37	1925	3.797
May	3.41	1924	4.010
April	3.46	1923	4.298
March	3.40	1922	4.301
Feb.	3.50		
Jan.	3.51		

[1]Taken from Federal Reserve Bulletin.
*Not final.

reasonable expectation during the next few months.

Prices of many kinds of bonds suffered drastic declines during the month of November. This, of course, would mean higher interest yields on the bonds. Even in the face of this situation, however. our index of the interest rate on school bonds sold actually declined by one point. This is, undoubtedly, a chance matter, but this seems to indicate that the confidence in school bonds has not been shaken. Although the average yield of bonds remained about the same, there was a conspicuous lack of issues selling under 4 per cent.

TABLE V. Security Prices and Yields[1]

Date	*Average Price of 404 Stocks (1926 Average = 100)*	*Average Price of 60 Bonds*	*Average Yield of 60 High-Grade Bonds*
Dec.	116.2*	98.2*	4.49*
Nov.	116.7*	99.0*	4.46*
Oct.	127.6	100.0	4.41
Sept.	148.8	100.0	4.41
Aug.	147.6	99.6	4.43
July	149.3	98.7	4.49
June	152.8	98.2	4.53
May	170.5	97.9	4.54
April	181.0	97.9	4.54
March	172.4	97.8	4.55
Feb.	166.5	96.4	4.65
Jan.	156.3	96.5	4.64

[1]As reported by Standard Statistics Company, Inc. Used by special permission.
*Not final.

In recent months, it has been very common to find a fair proportion of the school-bond issues selling at net interest rates of less than 4 per cent. An occasional issue has sold down to 3.60 per cent. One issue sold during the month of November carried a net interest rate of 6.52 per cent.

The total amount of school bonds sold during the month of November showed a substantial increase over the previous month. The total bond sales were approximately $23,000,000 as contrasted with $10,000,000 during the previous month. This increase, however, was almost entirely due to one excessively large issue in Chicago. This issue was $12,500,000. The total number of issues showed a substantial decline as compared with recent months.

The total municipal-bond sales in the United States during the first eleven months of the year showed a decided increase over the past year. In fact, the year 1927 is the only year on record in which a larger total of municipal bonds were sold during the first eleven months of the year. It looks now as though the total municipal bonds for the year 1930 will not fall much short of $1,500,000,000.

Table IV shows the average yield of long-term Federal Government bonds. The bonds of the Federal Government have shown a tendency toward declining interest rates, despite the increasing interest rates shown by industrial and commercial bonds. This tendency will repay watching as an indication of what may happen to school bonds.

Table V brings out very clearly the drastic decline that has occurred in stock prices. Perhaps the most surprising thing is the decline in bond prices and the increase in the yield of high-grade bonds since October.

TABLE VI. Revised Index Number of Wholesale Price
(United States Bureau of Labor Statistics. 1926 = 100)

Month	*All commodities*	*Building Materials*	*Year*	*All commodities*	*Building Material*
Dec.	81.1*	84.9*			
Nov.	81.3*	85.5*			
Oct.	82.6	85.8			
Sept.	84.2	86.4	1928	97.7	93.7
Aug.	84.0	87.4	1927	95.4	93.3
July	84.0	88.9	1926	100.0	100.0
June	86.8	90.0	1925	103.5	101.7
May	89.1	92.9	1924	98.1	102.3
April	90.7	94.7	1923	100.6	108.7
March	90.8	95.4			
Feb.	92.1	95.7			
Jan.	93.4	96.2			

*Not final.

Table VI presents further disquieting information. Wholesale prices of all commodities and all building materials continue to decline. As long as this continues, it is almost impossible for many great improvements to take place in the general industrial and business situation. However, it does indicate that building prices are in a favorable zone as compared with recent years. Certainly, from the standpoint of the cost of building materials, there is no reason why any school board should hesitate to start school construction.

SCHOOL FINANCE NEWS

♦ School expenditures in the middle-sized cities of Ohio vary greatly, according to a recent study of the Ohio state education department. The study was made on the basis of per-pupil average-daily attendance in the schools of Youngstown, Akron, Dayton, Columbus, and Toledo. Per-pupil cost for supervision and teachers' pay was found higher in Toledo, Columbus, and Dayton, with Youngstown and Akron lower.

In the operation of the school plant, which includes the pay of janitors, fuel, light, power, janitors' supplies, etc., Youngstown stood fourth on the list. In operation, Akron was low, having spent $379,969, or $7.99 per pupil; Dayton spent $273,228, or $10.03 per pupil. Columbus was high, having spent $494,953, or $12.04 per pupil.

There appeared to be little difference in the salaries paid superintendents of schools in the five cities. Columbus paid the lowest salary, $8,349; Akron and Youngstown paid the same, $10,000; Toledo paid $10,500, and Dayton was high with $10,833. Dayton and Youngstown had no assistant superintendents, and the other three cities had assistant superintendents.

♦ West Allis, Wis. The city council has approved a revised budget of $180,729 for operating expenses of the city schools. The council allowed the sum of $510,000 for teachers' salaries.

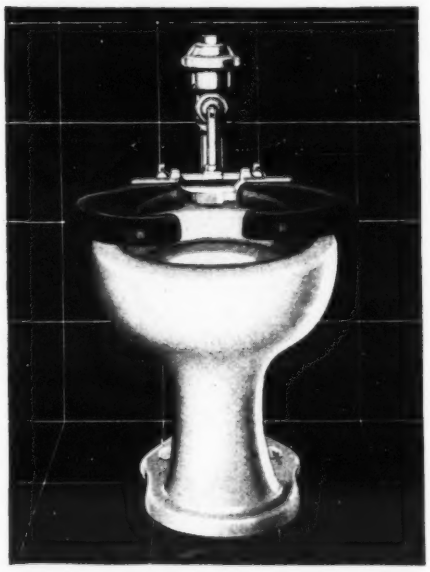
♦ Smithfield, R. I. The school board faces a threatened deficit for the fiscal year 1930–31, due to the installation of a water system and the payment out of fund for current expenditures.

♦ New York, N. Y. The school board has announced the construction of a new type of elementary school building in the awarding of a contract for the new Public School 24, in Queens Borough. The new school, which will be the P type, will be designed for communities with an anticipated growth in school population. The building will be built in the Classical style, with details in modified colonial. It will provide accommodations for 1,000.

Over 500 schools installed SLOAN Flush Valves during 1930

ARCHITECTS and school officials have again expressed their approval of Sloan Flush Valves by the convincing verdict of installations. More than five hundred of the principal school buildings erected during 1930 used Sloan Valves for their flushing equipment.

The reputation which Sloan Flush Valves have acquired in educational buildings of every type is due to their ability to withstand hard usage and give continuous, dependable service.



No thoughtless user can leave a closet unflushed when it is equipped with the Sloan seat-operated flush valve. It assures a positive complete flush each time the closet is used, which greatly improves the sanitary condition of the toilet room.

A complete line of Sloan hand-operated and automatic seat-operated flush valves, either exposed or concealed, provide for every school requirement or type of fixture, including floor or wall outlet closets, urinals and slop sinks. In addition valves with a measured flush are available for cold water showers and lavatories where maximum water savings are desired.

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1. Every Sonneborn product is backed by an organization with wide experience, great resources and the most advanced research facilities. We know the problems of upkeep throughout the school field. In helping you solve these problems, every Sonneborn product is *guaranteed* to make good. That is Sonneborn *Quality*.

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Consult with us about repairs which you are compelled to make while school is in session.

Note below a few of the Sonneborn products that will benefit your building and your budget. There are many more. Consult us.

LAPIDOLITH
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—For finishing, preserving and wearproofing wood floors.

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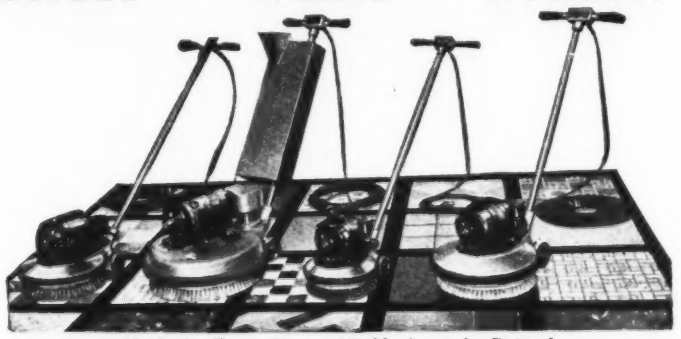

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With the old-fashioned mop and scrub brush rapidly losing caste, it is time for the modern schoolman to start investigating modern methods of floor cleaning. Up-to-date sanitation standards demand it. No longer is it satisfactory just to keep the floors wiped up. They should be kept glistening, and a Hild Floor Machine will do it in a quarter of the time and better than the best scrubwomen could do it.

These are four models of Hild Floor Machines—a size for every floor area and purse. The Hild Floor Machine will scrub, polish, wax, sandpaper and refinish with a thoroughness that is remarkable.

Look for Hild's Exhibit at the Department of Superintendence of the N. E. A. Convention at Detroit, February 21st to 26th, Booth No. 301.

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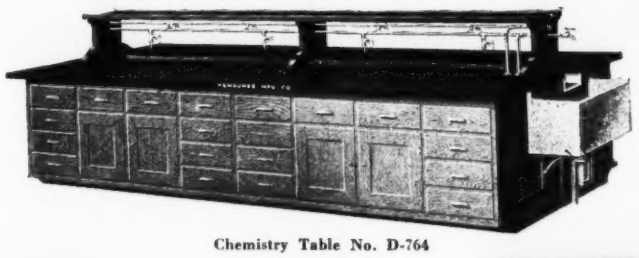
It will be a pleasure to show you our exhibit at the N. E. A. Convention, Detroit, Mich., Feb. 21-26, 1931.



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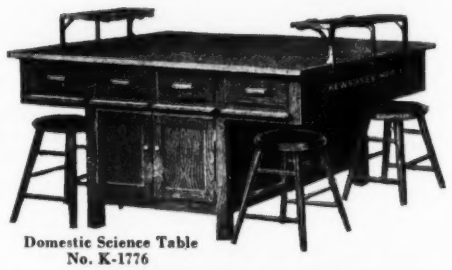
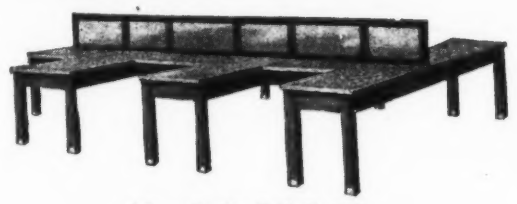
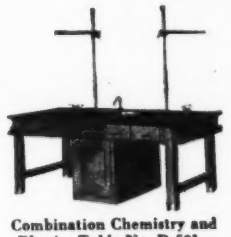


Domestic Science Table No. K-1776

Drawing Table No. L-2028



Library Reading Table No. 5143



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THE NEW WEST HIGH SCHOOL, MADISON, WISCONSIN

(Concluded from Page 80)

scheme in blue, green, and brown, makes it both attractive and restful to the eye.

The cafeteria includes numerous points of special design. There is an abundance of ample light at all times and the room has been treated with a colored asphalt tile floor and acoustical wall material so that it is quiet under all conditions.

The art rooms of the building are attractively situated so that the full sweep of beautiful Lake Mendota, with its rocky bluffs and wooded hills, may be seen.

The real value of a building like the West High School of Madison is in the fact that it represents ideals of American thinking and American aspirations. The pupil who, in four or six years becomes familiar with such surroundings of dignity and beauty, goes forth changed into something of their likeness.

The New West High School, Madison, Wisconsin

Bids received July 31, 1929; contract awarded August 1, 1929; work started August 2, 1929; building occupied September 8, 1930.

Dimensions of site 755.75 by 540 feet (less 50 by 120 feet).

Area of site 401,700 square feet.

Main frontage on Ash Street — to the east.

Exterior facing — brick and stone.

Construction material: reinforced concrete and structural steel.

Corridor and stair finish: stairs, terrazzo; corridors, terrazzo, border asphalt on tile field.

Classroom finish — oak.

Gymnasium finish — cork wainscoting; brick walls.

Finish of toilet rooms — marble.

Heating and Ventilation. Unit ventilators, automatic stokers, three steel boilers, automatic temperature regulation; vacuum traps and valves.

The entire building, excepting the auditorium, is ventilated by the unit-type ventilators grouped in zones for purposes of giving different sections of the building proper ventilation while other parts of the building may not be used. The auditorium will be ventilated from one central unit exclusively.

Divisions of zones are separated as follows: Auditorium, separate unit; gymnasium, boys' and girls' separate cafeteria, in separate unit; junior high school, separate unit; senior high rooms, one unit; music rooms, one unit; library, separate unit.

All above listed zones are regulated by a dual thermostat-control system. Windows may be opened in one room without disturbing the ventilation. The direct heating system is a vacuum system also operating on gravity.

Electrical Equipment. Standard type with six 200-watt outlets for classrooms. Corridors provided with a dual system having one circuit for days and using same circuit with one additional circuit for night operation. All classrooms and study halls, also cafeteria, equipped with stereoptical outlets. Entire building equipped with clocks, buzzers, telephone, and signal system.

Plumbing and Sanitary Equipment. All designed that operating devices are accessible, making repairs possible without disturbing building.

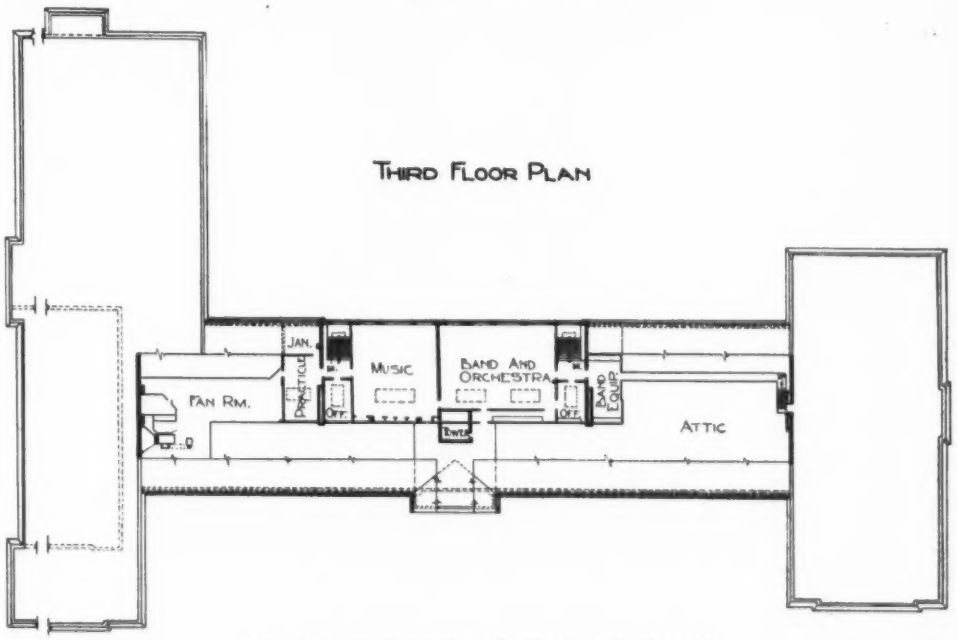
Cost of site	$ 100,000
Cost of improving grounds up to date	27,000
Cost of building	793,026
Cost of equipment	86,102
Total cost to date	1,006,128

Acoustics. The auditorium, the cafeteria, the music rooms, and the typewriting rooms of the commercial department are treated with acoustical plaster to absorb noise. Floors in corridors and cafeteria have a mastic floor covering which has sufficient resiliency to overcome the noise of the much tramping when groups are in motion along them.

Floors. Classroom and study-room floors are of best-grade maple. Toilet and shower rooms are of terrazzo. Toilet and shower walls are lined with marble to a height of six feet.

Trim. Entire building except manual-training rooms, toilets, and shower rooms, finished in flat-sawed red oak.

Lockers. Corridors are equipped with double type of recess locker.



WEST HIGH SCHOOL, MADISON, WISCONSIN
Law, Law and Potter, Architects, Madison, Wisconsin

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LOCKS AUTOMATICALLY WHEN CLOSED
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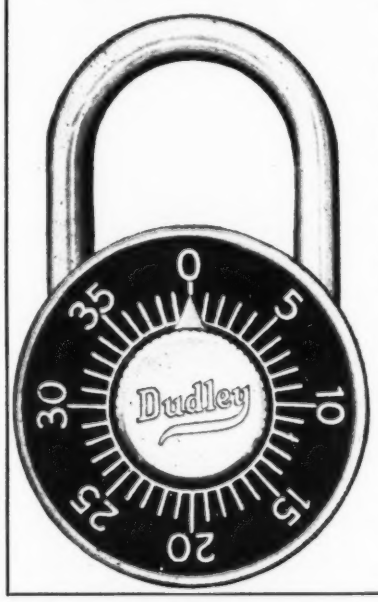

Here's a lock that supplies every padlock need—it is keyless, self-locking, pick-proof, fool-proof and rust-proof.

Most progressive schools long ago dispensed with the problems of lost, forgotten or misplaced keys, by installing Dudley combination locks. With Dudley locks, key-board nuisance, master-key menace, and pilfering are impossible. Now Dudley announces a new self-locking lock — the most useful padlock that has ever borne the Dudley name. *Write for sample for free examination.*

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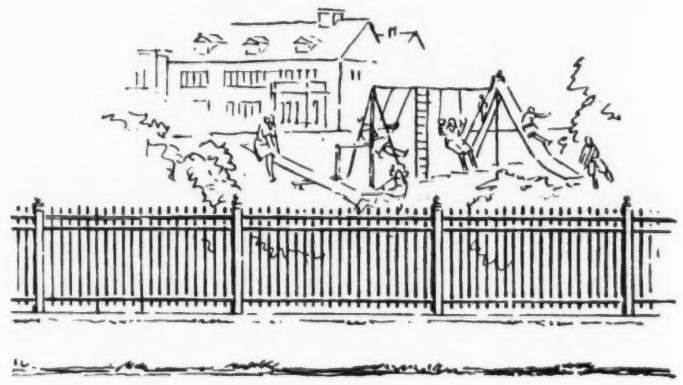


YOU will find that a Stewart Iron Fence—with its extra value in extreme durability as well as appearance—is the most practical of school fence enclosures. For comparison, *let us send you our Illustrated Catalog* which shows both Iron Picket and Chain Link Fences. Address—*The Stewart Iron Works Co., Inc., 605 Stewart Block, Cincinnati, Ohio.*

Stewart FENCES

ULTIMATE PHYSICAL PLANT PROGRAMS

(Concluded from Page 81)

Locating Sites

Population trends, and the growth in each school district, and the number of pupils of each school type in each district, will automatically determine when a school needs to be erected, the type of school to be provided, the site to be used, and the size of the building; also the chronological order in which additions to existing school buildings shall be built.

The location of all new sites that will be required, and the determination of needed additions on existing sites, enable accurate land valuations to be figured out and the formulation of an ultimate land program.

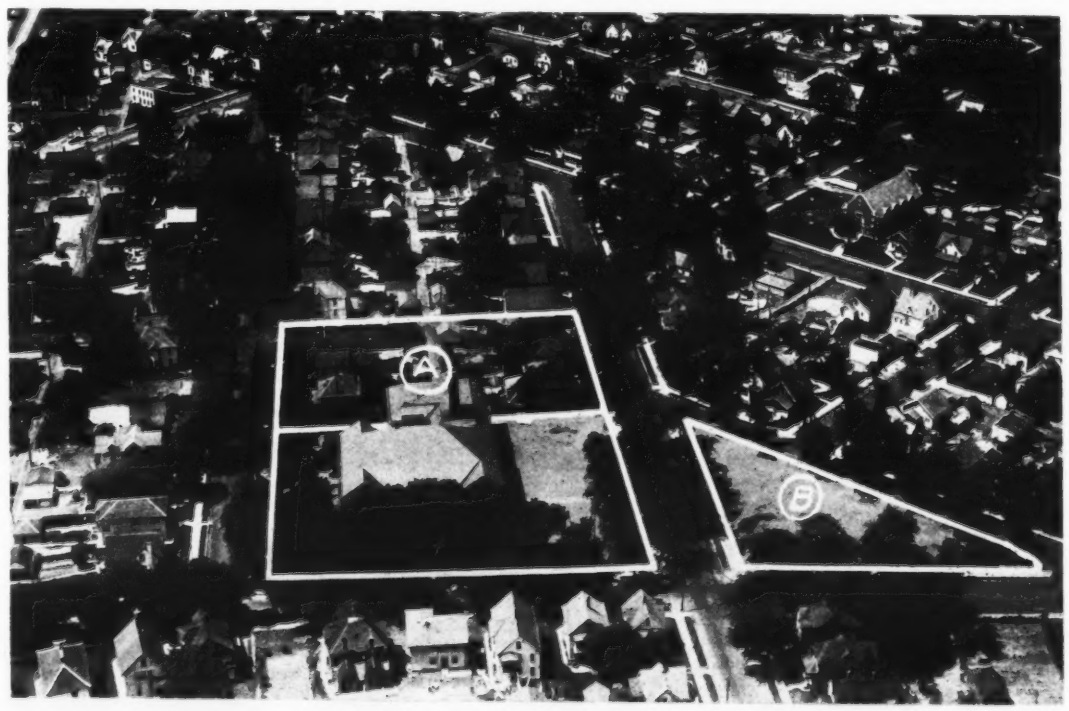
A definite site having been provided for every type and size of school that will have to be constructed, an ultimate building program is readily formulated. The ground conditions at each site being known, the factors affecting the cost of building construction are taken into account, such as the need for piling where the ground is soft and swampy, blasting where the ground is hard and rocky, filling where depressions and ravines exist, leveling where high elevations and embankments have to be removed, etc.

The ultimate ground-improvement program follows. It involves clearing, filling, grading, gutters, sidewalks, fences, trees, and landscaping. These ground improvements cover both old and new sites.

Using Aerial Photographs

The sale of school physical plant programs to schoolboard members and to communities frequently fails because board members and taxpayers are unable to clearly visualize the activities involved. Aerial photographs solve this problem very satisfactorily. An aerial photograph of each school site, from not too high an altitude, giving a bird's-eye view and showing the stage of development of each site and all improvements on each site and on all property adjoining, adjacent, or near by, enables the school administrators to prepare a number of separate, detailed surveys or reports covering as many subdivisions of the ultimate physical plant capital improvement program as may be wanted. Separate, detailed reports, by schools, are prepared on sites, ground improvements, new buildings, additions to existing buildings, curbing, gutters, sidewalks, filling, grading, trees, fences, landscaping, etc.

Having prepared the ultimate physical plant program, its segregation into annual expenditure budgets becomes a matter of choice and selection governed by school expansion needs, and of ways and means to finance the segments of the program undertaken each year.



LOWELL ELEMENTARY SCHOOL, MINNEAPOLIS, MINNESOTA

The undesignated area enclosed in heavy white lines is owned by the board of education. Area "B" is owned by the park board and is used by the schools for playground purposes. Area "A" should be purchased to give the school sufficient playground area. The cost will be $36,000 for additional land.

THE MANY ADVANTAGES OF - - - BERLOY LOCKERS - - - WIN SCHOOL AUTHORITIES

Installation of BERLOY Lockers in Shore High School,, Cleveland, Ohio

THE attractive appearance of BERLOY Lockers gives a clean-cut, regimental effect. They *look* efficient and they *are*.

The entire construction is of great strength and rigidity equal to the hard use lockers are bound to receive. The door, for example, is of one-piece steel strongly reinforced on the inside with formed channels. The handle is of sturdy strap steel . . . *non-breakable* . . . with padlock attachment.

The comparatively quiet operation is a factor of great importance. Rubber bumpers are placed at the top and bottom of locking bar. The locking device is positive — always operating securely and satisfactorily.

There are many other advantages in BERLOY Lockers. If you are interested in quiet, efficient, good-looking lockers, send for BERLOY suggestions and data.

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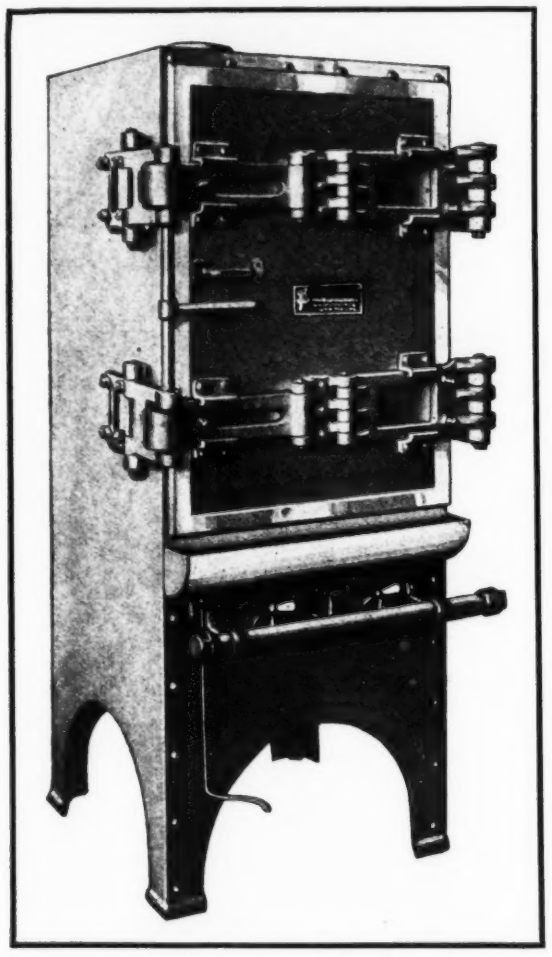

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Produces more wholesome and appetizing meats, vegetables, etc. Cooking compartment 18 inches by 21 inches by 37 inches high. Exterior finish of battleship grey enamel with Monel Metal Trim. Shipping weight approximately 1,000 lbs. You can order the Van Gas Steamer direct from the John Van Range Co. Price $487.50

Add the VAN GAS STEAMER to *your* kitchen

. . . . . and watch it pay for itself!

THAT'S just what the Van Gas Steamer is doing in school kitchens all over the country—paying for itself! For it not only prepares food more tastefully than ever before but reduces gas consumption, labor cost, and food waste absolutely to a minimum.

Developed by leading kitchen engineers, the Van Gas Steamer embodies the finest heavy quality construction that money can buy. The secret of its superior cooking qualities is found in the cooking compartment, a one piece shell of pure Monel Metal. Here both the water and temperature are automatically maintained at constant levels, and thus the food retains its natural tasty flavor without losing any of the nourishing ingredients often lost in the cooking.

You'll be surprised to learn how easily the Van Gas Steamer can be added to your present kitchen equipment. Let us tell you just ***how quickly*** the Van Gas Steamer can pay for itself in *your* kitchen. Without the slightest obligation, write us today, for complete information.

The John Van Range Co.
EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Cincinnati

General Offices: Oakley, Cincinnati, Ohio

WHAT QUALITY SCHOOL BUILDING?

(Continued from Page 38)

of initial cost between central fan and unit systems had been made and on both occasions the central fans proved to be the cheaper, and so the figures under a Grade B building again showed the same result. However, under a Grade A building the result is reversed, making the unit system cheaper than the central fan. This is probably due to the fact that in a Grade A building a positive mechanical exhaust with recirculation possibilities is provided, whereas only a gravity exhaust is provided for the unit system.

We shall not carry the discussion on this point further for fear of losing the entire perspective of the problem regarding the complete grading of school buildings into three qualities of construction and finish. We must, however, explain what is meant by the term "modified" unit system of heating and ventilating, as used above. This system consists of a new type of unit ventilator, developed by a leading unit ventilator manufacturer. The theory of operation of this machine is based upon a scheme for regulating the temperature of the room, and air motion, as necessary for comfort, discarding the old theory of air change. The system in this case does away with the necessity of one boiler and considerably reduces pipe sizes. The writer looks favorably upon the ideas claimed by the manufacturer and would have been willing to recommend the scheme for a test in Cleveland, had the contractors allowed a reasonable deduction for the work omitted. But as they refused to do this, for some reason best known to themselves, the test was not made.

Structural Differences

Three separate and distinct structural designs were made for the building, in each case using outside bearing walls and steel columns for the interior. The question of a complete structural frame instead of bearing walls was not given consideration because this kind of construction had been tested out by duplicate designs some time previously, and the bearing-wall design (for three-story building) had been found to be slightly cheaper.

The structural differences were graded as follows:

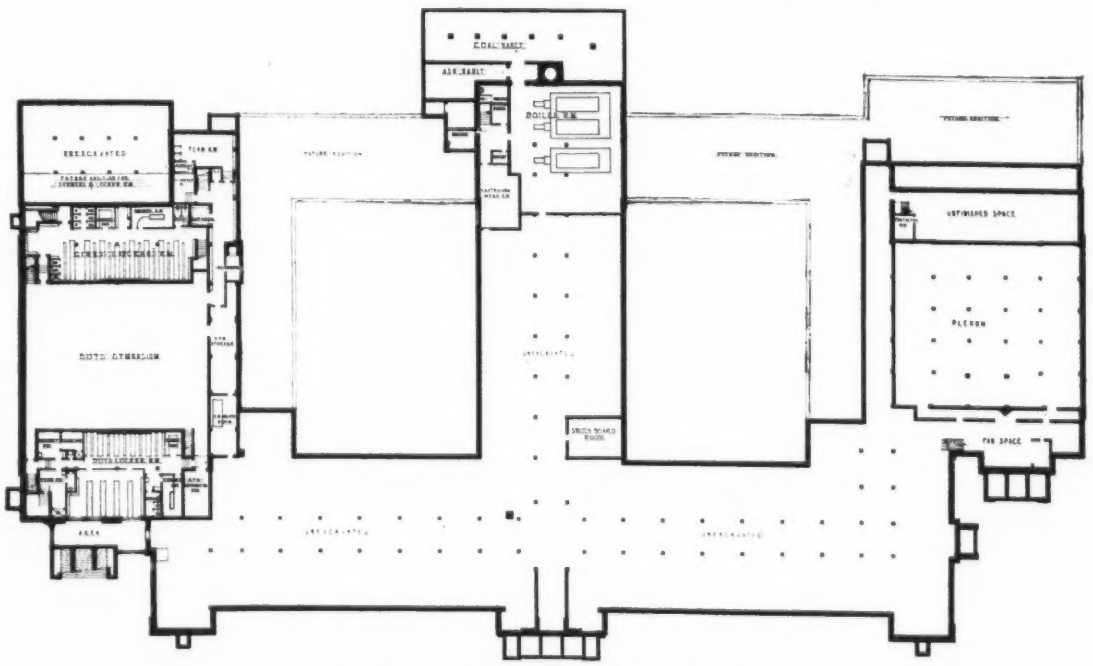
Grade A Building. Steel columns along corridor partitions, outside bearing walls, floors of long-span reinforced-concrete tin-pan construction. Steel floor girders. Roof construction of steel beams supporting precast slabs.

Grade B Building. Similar to Grade A except that certain reinforced-concrete girders were substituted for steel girders. Roof construction, floor slabs, and columns similar to Grade A.

Grade C Building. Changed from Grade A in respect to floor construction, for which "open joists" were substituted. Roof composed of light metal deck on steel purlins.

In passing on the foregoing differences, the writer came to the conclusion that possibly the Grade B building might have consisted of a complete system of reinforced-concrete construction, including the columns and roof, and omitting all structural steel. It appeared that this might have shown a little more saving be-

(Concluded on Page 134)



GROUND FLOOR PLAN

JOHN MARSHALL HIGH SCHOOL, CLEVELAND, OHIO
George M. Hopkinson, Architect of the Board of Education

Putting *Science* into Domestic Science and Food Service

at W. H. Kirk Junior High
East Cleveland

"OUR W. H. Kirk Junior High School was planned to be the most modern building of its kind in the state," says President W. H. Provo, of the East Cleveland Board of Education. Very logically, therefore, the most modern refrigerators were selected—a General Electric S-62 in one domestic science room—another General Electric S-62 in the other domestic science room—a General Electric commercial model CS-600 in the main cafeteria, for salads—General Electric commercial model CS-450 in the main cafeteria, for milk and other foods—two General Electric models PL-17 in the main kitchen—a General Electric model S-62 and a General Electric model DP-1 Water Cooler in the teachers' cafeteria—two General Electric model DP-3 Water Coolers in the main dining room.

The excellence of the School Board's judgment has been confirmed by the excellence of General Electric performance, as President Provo or the school staff will tell you. The domestic science classes, like the restaurant personnel, are learning how much the General Electric Monitor Top means—faithful, healthful food preservation—operating and food budget economy—extreme quiet—freedom from even the slightest routine attention—exemplary cleanliness—*and pride.*

The years will only add to the evidence that civic and pedagogic responsibilities have been wisely discharged at Kirk Junior High, as in the hundreds of other schools equipped with General Electric Refrigerators.

Section CK1, Electric Refrigeration Department, General Electric Company, Hanna Building, 1400 Euclid Avenue, Cleveland.

GENERAL ELECTRIC
COMMERCIAL REFRIGERATORS

No. 1055 Three Class Multi-Service Physics and Chemistry Table.

Three Generations of Laboratory Furniture Craftsmen

Since 1898, millions of dollars worth of SHELDON laboratory furniture has been shipped to schools, universities and industrial plants in every state in the Union.

Behind this great business are trained men, men who know every need of the college professor, or high school teacher, men who know woods, metals, plumbing, hardware, and auxiliary items, men who have grown up with the SHELDON COMPANY, men whose sons are coming into the business.

These craftsmen have helped the name SHELDON to become synonymous with engineering ability, superior service and *good laboratory furniture.*

Have you the newest SHELDON catalog?

E. H. SHELDON AND COMPANY, Muskegon, Michigan

Laboratory furniture specialists for 35 Years. *Canadian Factory at Sarnia, Ontario.*

(Concluded from Page 132)

tween a Grade A and a Grade B building. However, I do not think that the answer which we set out to find would have been seriously affected, because the question of value "received" must be taken into consideration in judging the result.

What the Bids Revealed

The bids received for the four major trades namely: general construction, heating and ventilating, plumbing, and electrical work, were as follows:

Grade A Building

$885,484. Including central fan system, positive exhaust.

$881,633. Including unit system, gravity exhaust.

$878,745. Including "modified" unit system.

Grade B Building

$838,404. Including central fan system, gravity exhaust.

$842,222. Including unit system, gravity exhaust.

$840,120. Including "modified" unit system.

Grade C Building

$777,689. Including unit system and oil burners.

$773,326. Including "modified" unit system and oil burners.

The foregoing figures indicate the following differences:

1. Between the lowest-priced Grade A building and the lowest priced Grade B building, a difference of $40,341, or a saving of 4 5/10 per cent.

2. Between the lowest priced Grade A building and the lowest priced Grade C building, a difference of $105,419, or a saving of 12 per cent.

3. That the central fan system, with the positive exhaust omitted, showed *less cost* than a unit system, also without positive exhaust.

The Grade Adopted

After considering and evaluating the above differences, the writer came to the conclusion that, within a period of from 15 to 20 years, more than the difference in cost would have to be spent in maintenance and replacements. Therefore any saving made in this way at this time would be "penny wise and pound foolish" and burden the taxpayers in the very near future with expense that should properly be met in the first instance. Finally, continuous maintenance costs throughout the life of the building within a limited degree, will be negligible.

Recommendations were made by the architect that a Grade A building be constructed with a unit system of heating and ventilating (a unit system as set up under a Grade A building being cheaper than central fans) which reflected what the writer considers to be sound judgment in the selection of a grade of construction and finish for school buildings.

THE CONCORDIA, KANSAS, JUNIOR-SENIOR HIGH SCHOOL

(Continued from Page 40)

sium is readily accessible from the main corridor and the boys' and girls' dressing rooms. Direct light is received from three sides.

The commercial unit is also located on the first floor in the northeast corner. This unit consists of a typing room, a room for bookkeeping, shorthand, and banking, and a classroom that is used by both the commercial department and the general office as a commercial laboratory. This department is equipped with unit desks.

The auditorium is located in the center of the building with direct lighting and ventilation from the north and the south. Its seating capacity is approximately 1,000. It contains a modern stage 54 by 30 feet with scenic equipment, a projection booth and an acoustically treated ceiling. The audition effect is almost perfect.

As the visitor enters the main corridor from the north he is at once impressed with the artistic appearance. The foyer, the terrazzo floors, the composition side wall, the beam ceiling, the trophy cases, the wrought-iron railing along the stairways leading to the second floor, all help to impress one with the completeness of the design.

Second Floor

On the second floor are found the art studio and classroom, the art corridor, and the music room. From the art corridor access is had to the balcony of the auditorium and also the gymnasium, and to the academic unit on the west, where there are 8 additional classrooms, a library, toilets, storerooms, etc.

The artroom is equipped with unit adjustable-top tables, a teacher's office, a storeroom, and a finishing room. Outside light comes from three sides.

The art corridor has a vaulted ceiling, burlap-lined walls for display, and indirect-lighting which adds materially to the artistry of this hallway.

At the south end of the art corridor is found the music unit. This room is also floored with battleship linoleum. In arrangement it contains a platform, an auditorium for classroom work, a teacher's office, and suitable storeroom space. This room is practically soundproof, as one finds little or no reverberation of sound throughout the other part of the building from the playing of instruments.

Utilization of Building

By referring to the accompanying daily program schedule, it will be noted that the percentage of the ideal 100 per cent is 80 per cent, which is generally considered correct for a new building if a sensible provision has been made

(Concluded on Page 137)

Eclipse Adjustable Desk Set

TROUBLEPROOF!

HERE is a rugged, practical, troubleproof desk that will withstand years of the most severe use and abuse. It is simple yet sturdy in construction. There is nothing to loosen, break, or get out of order. All metal parts are of steel with a smooth, rustproof finish. Extra heavy wood is used in the desk top and seat. » » » » »

The range of adjustment is exceptionally wide and will accommodate more pupils than the average desk of this character. The adjustment mechanism is easy to operate, holds like a vise, and prevents looseness or vibration. The swivel top chair has round cross slats and has been scientifically designed to induce correct posture. Ask your nearest Heywood-Wakefield Sales Office about this and other practical school desks designed by men who have had years of actual, practical experience in the production of serviceable school seating.

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MULTI-PHONE

Gives Your Students the Opportunity of Hearing Renowned Leaders

AS AN advocate of advanced methods in education you should do everything possible to aid the educational advantages of your school.

History, Music, Geography, Civics, Economics, and the Sciences are discussed over the air—and with the "Multi-Phone System" you can give students the added interest which is always repaid by better results.

The "Multi-Phone System" includes installations up to a hundred or more rooms. A microphone is installed in the principal's office for announcements and daily assignments. Instructions for each day can be transmitted simultaneously to every room in the school.

The new magnetic flush-wall speaker, with a facing of tapestry, is our contribution to the beautification of schools.

In planning your new school or addition make reservations for a Multi-Selecto centralized radio system.

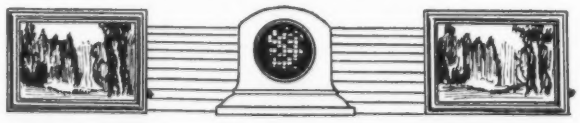
Write us for plans and specifications.

"Installations include radio, phonograph and microphone"

MULTI-SELECTO PHONOGRAPH CO., INC.

Educational Department

GRAND RAPIDS, MICHIGAN



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With Side Fine-Adjustment, Lever Type, Is an IDEAL INSTRUMENT FOR HIGH SCHOOL USE.

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It has found its way to more than 3000 of the best high schools and colleges in United States. What better recommendation?

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Laboratory, Vocational, Home Economics and Library Furniture

Modern in Design and Construction, PETERSON EQUIPMENT meets the needs of today's education. A wide and varied selection enables your school to select for its specific needs.

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Reading Table of improved construction, assuring absolute rigidity . . . legs equipped with brass sockets.

We maintain a service department which will gladly discuss and advise on your particular requirements.

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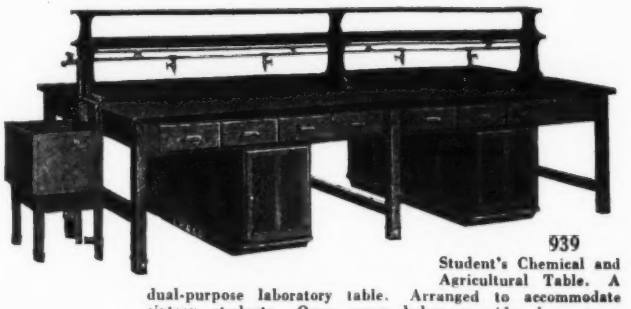
1135
Student's Biology Table. A double-duty Laboratory and recitation table used where it is preferable to have the students face one way.

1205
A dual-purpose table serving both Physics and Chemistry instruction. Ample drawer and cupboard space. Two compartments in rear for tubing, etc.



939
Student's Chemical and Agricultural Table. A dual-purpose laboratory table. Arranged to accommodate sixteen students. Open space below provides knee room when seats are used.

(Concluded from Page 134)

for increase of enrollment. It will be noted that the average class size is considerably lower than the room capacity, especially in the academic classrooms. All of the unspecialized classrooms are approximately the same size, of sufficient capacity to care for classes as large as are now predicted.

An unusual feature of the building is the liberal allotment of space to special rooms and departments. The present efficiency of utilization is given at 76.2 per cent compared to 82.3 per cent for academic portions. The auditorium, agriculture shop, and pool were not considered, which allows for further special work. In assuming the saturation point of the building capacity the special departments were purposely designed to be adequate when several additional academic rooms were required. Such rooms may be easily added to the structure, but it is always difficult to add to special departments if the efficiency of plan and administration is to be preserved.

General

Interspersed throughout the hallways are inserted metal lockers flush with the walls and controlled by a combination locking system.

The student capacity of the building is easily one thousand or more when all units are carrying their approximate student load.

Mechanical ventilation of the unit type is used.

For the convenience of both pupils and teachers, bulletin boards are built into the walls outside the door of every classroom.

Salt-glazed tile is profusely used throughout the corridors, except the corridor in front of main entrance, the cafeteria, the pool, and the manual-arts department.

The school system in Concordia, Kansas, is organized on the six-three-three basis. The new high-school building cares for grades seven to twelve. In the main, grades seven, eight, and nine are assigned to the second floor and grades ten, eleven, and twelve to the first floor, the exception being made in the departments of physical education, manual arts, and household arts.

THE HIGH-SCHOOL COMMERCIAL UNIT

(Concluded from Page 56)

cludes training in the use of calculating machines, comptometers, adding machines, bookkeeping machines, and copying machines. Table V shows the extent to which the various items of equipment are found in office-practice rooms.

TABLE V. Percentage of High Schools Having Certain Items of Equipment in the Office-Practice Room and Percentages of Heads of Departments Classifying the Item Essential, Desirable, or Undesirable

Item	*Having Item*	*Per Cent of Schools Consider Essential*	*Consider Desirable*	*Consider Undesirable*
Noiseless Typewriter	92	100	0	0
Filing Cabinets	92	100	0	0
Adding Machine	85	100	0	0
Mimeograph	85	100	0	0
Postal Guides	85	100	0	0
Card Indexes	70	70	13	17
Numbering Machine	42	88	12	0
Check Writer	35	45	45	10
Billing Machine	32	45	55	0
Stencil Stand	28	35	30	35
Envelope Sealer	28	35	17	48
Hectograph	25	22	37	41
Stamp Moistener	24	26	35	39
Safe	24	17	65	18
Addressograph	22	13	28	59
Check Protector	22	35	35	30
Slide Ruler	19	22	43	35
Multigraph	18	26	39	35
Bookkeeping Machine	17	64	26	10
Posting Machine	16	35	45	20
Letter Press	15	12	23	65
Wire Stitcher	12	0	36	64
Dictaphone	12	42	28	30
Stenotype	12	15	60	25

The noiseless typewriter is a special provision in this room, found in 92 per cent of the schools. The adding machine and the mimeograph are the two most commonly found machines, as far as this group of schools is concerned. The former is used chiefly for checking, and the latter for copying. The dictaphone, quite uncommon in general offices, is found in only 12 per cent of the schools. The posting machine and the bookkeeping machine show only slightly higher percentages of occurrence. There is a wide variety of office practices which might be included in office training. Correct methods of filing is an essential thing in office routine; the handling of correspondence may include the use of such other devices as the addressograph, stamp moistener, envelope sealer, postal guides, and stencil cutter. All of these items are included in the rooms, in varying percentages.

The work of the office-practice laboratory may include the training in banking. The bank is found in 35 per cent of the schools.

Summary. The typical commercial unit of 125 North Central high schools is made up of a bookkeeping room, a typewriting room, a stenography room, and a commercial recitation room. These are grouped as a unit, centrally located in the building, on the second floor. The department enrolls 475 students. One commercial room is provided for each 34 students enrolled in the department. The bookkeeping room has a floor area of 640 square feet and provides for 36 students; has 185 square feet of blackboard space, and 12 square feet of bulletin-board space. The room is adequately provided with desirable equipment. The stenography room is separate, has a floor area of 725 square feet, and accommodates 37 students. It has individual student desks, a bulletin board and a bookcase are provided. The typewriter room, adjacent to the stenography room, has a floor area of 690 square feet and provides 42 pupil stations. Individual tables are reported. The room furnishes different makes of typewriters.

PLANNING SCIENCE LABORATORIES FOR HIGH SCHOOLS

(Continued from Page 66)

school-science subjects: chemistry, physics, biology, and general science. In all but very large schools the general-science classes may well use the other laboratories, particularly the biology laboratory. Smaller schools often use a single laboratory for physics and chemistry, and another laboratory for biology and general science. In the smaller schools where there are but three or four classes in all sciences altogether, one single laboratory for all will suffice, provided it is equipped with special furniture for student desks, and with sufficient cabinet and storage room, and apparatus, equipment, and supplies.

Studies made in many high schools show that few laboratories are used to their capacity. Dr. P. C. Parker several years ago made a study in eight cosmopolitan high schools in New York City. His results are given in a bulletin published by Teachers' College, Columbia University on *Housing of High-School Programs*. Doctor Parker found in the eight high schools chemistry laboratories with a total capacity of 4,350 students, a total enrollment of 1,787 students, or 41 per cent of the capacity. Physics laboratories in the eight schools had capacity of 3,010 pupils and an enrollment of 863, or 29 per cent. The biological laboratories were used 56 per cent of their capacity. In other words, the chemistry laboratories were idle 59 per cent of the time; physics laboratories, 71 per cent; and the biological laboratories, 44 per cent.

This waste is particularly noticeable in smaller schools. A recent study, made from statistics of the United States Office of Education and others, shows that between 80 and 85 per cent of all public high schools have but one instructor in the sciences, or the equivalent of but one full-time instructor. This means that not over one science class is or need be at work at any one time, and therefore that not more than a single laboratory is or need be in use at one time. On the days when science classes are scheduled for classroom recitations and for lecture demonstrations, the laboratories in most cases are not in use at all. It is for these one-science-teacher schools that a single laboratory, specially equipped, often can be made to suffice and is a considerable economy in space and in building costs.

In determining the number of laboratories it is first necessary to estimate the probable enrollment during the immediate years to be provided for, remembering that if courses are elective, approximately 53 per cent of all students will be in laboratory science courses. In rural schools where agriculture and household economy are emphasized, the percentage will probably be larger. In many schools freshman and sophomore sciences are required of all pupils with physics and chemistry elective to junior and seniors. This must be taken into consideration.

In all secondary schools in the United States, according to statistics of the U. S. Office of Education, approximately 40 per cent of the pupils are in the first-year class, 27 per cent in the second year, 20 per cent in the third, and 13 per cent in the fourth or senior year. The following table gives the number by classes for schools of 100, 200, and 500 pupils respectively. It gives, also, the probable and possible number in science.

Distribution of Pupils in Science Classes

	Enroll-ment	*No. in Science*	*Enroll-ment*	*No. in Science*	*Enroll-ment*	*No. in Science*
Total	100	50–100	200	100–200	500	250–500
First Year....	40	20– 40	80	40– 80	200	100–200
Second Year	27	14– 27	54	27– 54	135	68–135
Third Year..	20	10– 20	40	20– 40	100	50–100
Fourth Year	13	7– 13	26	13– 26	65	33– 65

From these figures it is evident that in the school of 100 pupils there will be as a rule one class in each of the four common sciences. If all pupils in the first year are required to take the general-science course, the class should be divided for laboratory work in two sections, as 24 is about the maximum that a single instructor can supervise efficiently. However, the third- and fourth-year courses would hardly be compulsory, and therefore, both physics and chemistry should not be given in the same year, but should alternate by years, juniors and seniors being in one class together. The total number of science sections or classes would be, therefore, not more than four. Each section or class, if the most common practice is followed, would have each week three double periods for laboratory work, and two single periods for demonstrations and recitations, the usual period being 45 minutes. This means each class or section has a total of 8 periods per week. All 4 sections and classes would have 12 double periods and 8 single periods, or a total of 32 periods, of 45 minutes, a week. The usual school week is 5 days of 6 periods each. A single laboratory therefore equipped with suitable furniture can be made to answer the needs of a school of 100 pupils, if funds are scarce; however, 2 laboratories should be provided if possible. One would be used for general science and biology, the other for physics and chemistry. Both should be used for demonstration exercises and recitations, rather than using other rooms for these purposes.

A high school of 200 total enrollment would have 2 or 3 sections in general science and 1 or 2 sections in biology. Generally, under the elective system, there would be but 3 sections in these 2 subjects. A single laboratory will accommodate these 3 sections in both laboratory work and recitations. A single laboratory for physics and chemistry will accommodate both subjects even if both are given the same year.

For a school of 500 probably two general-science laboratories may be necessary, and a separate laboratory for each of the subjects, biology, physics, and chemistry. However, if only 50 to 60 per cent of the pupils in the various classes are enrolled in the science courses, a total of four laboratories is sufficient, the biology or physics laboratory being used for the general science overflow.

Many instructors will object to this dual use of a room, the chemistry teacher for instance claiming that if his laboratory is used for physics the chemistry apparatus will be interfered with by physics pupils.

(To Be Concluded)

STATE ARCHITECTURAL SERVICE FOR SCHOOLS

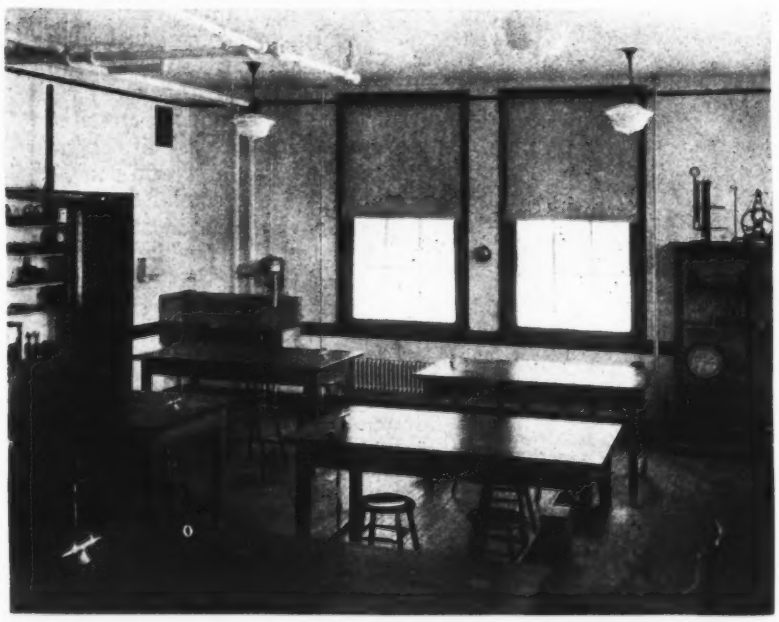
The question of how far the state control of school architecture may go without impairing the quality of school structures has had the attention of the American Institute of Architects. "In a few states at least," says the official organ of that organization, "architectural service for schools has been taken over either wholly or in part by a department of the state board of education — to the detriment not only of the architect but more particularly of good architecture."

The article then says: "There seems to be a very general practice of furnishing stock plans without further service to rural communities for the small type of school building of not more than two, three, or four rooms. This service is no doubt well justified, and from the standpoint of the architectural profession there are probably very few architects who could afford to take on this class of work.

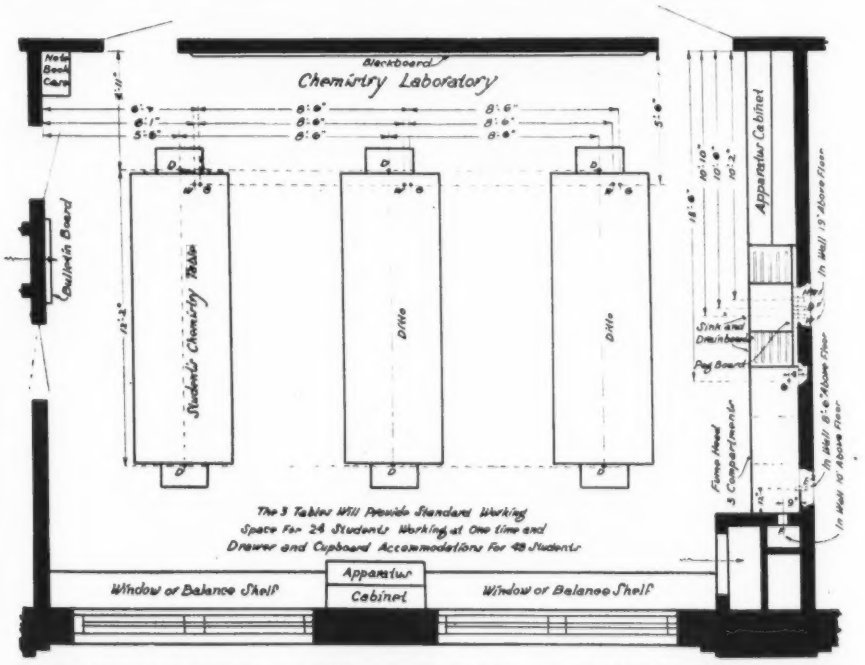
"As soon, however, as the school arrives at the six-room size or greater, it comes to a point where special architectural service becomes of value to the community, and where the failure to provide it is worth the serious attention of the architectural profession.

"It is significant that the greatest difficulties lie with those communities which have only the occasional building. Communities which have a more or less continuous school-building program have long since become conscious of the need of a real professional service.

"Of course, the soundest argument against the state bureau is that in the vast majority of cases it lapses into ruts of design and practice with a resulting sameness of expression which is contrary to the spirit of the problem itself as well as to that of good architecture."



PHYSICS LABORATORY, ROCHESTER, NEW YORK



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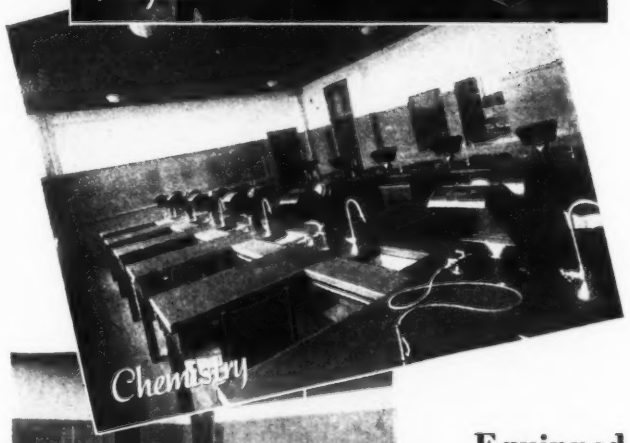

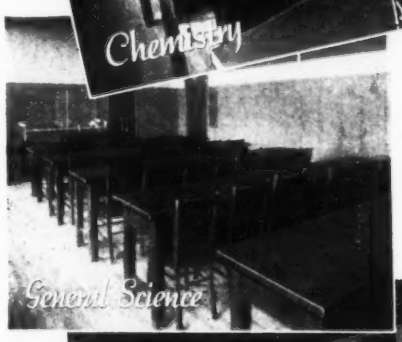

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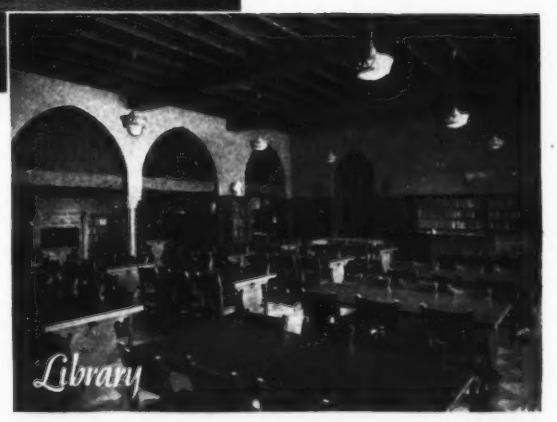

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TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS

(Concluded from Page 48)

by a Vineyard artist. The rear of the study hall is furnished as a library alcove with commodious bookcases and tables. Adjoining the study hall is a large classroom, and the sliding partition between these two rooms makes it possible to use them as one room for assembly purposes, parent-teacher meetings, etc.

In the basement, which is really a ground floor, being only two or three feet below the surface level, are located the boiler room, opportunity room, manual-training shop, domestic-science room, lunchroom, and woodworking supply and finishing room.

Entirely outside the rear of the building, an underground coal bin adjoins the boiler room, and an ash hoist is installed for the easy removal of ashes. The garbage burner is located in the boiler room and the heat generated is used to supplement the hot-water heater supplying hot water to the domestic-science room and to all lavatories.

The domestic-science room connects with the lunchroom by Dutch doors and is unusually well equipped with electrical appliances, such as stove, refrigerator, flat irons. Modern steam tables make possible the serving of hot foods for school lunches.

Tisbury high school manual training is unique. The department is equipped with band saw, surfacer, saw table, sanding machine, hollow-chisel mortise, and tool sharpener, all electrically driven, but the architects have replaced the ordinary individual benches with a continuous, real old-fashioned carpenter bench around the sides of the rooms. Wide doors make it possible to drive a car into the room.

An interesting feature of the construction is the placing of all plumbing pipes in spaces about two feet wide behind the toilets, so that repairs are easily made without taking up floors or tearing down partitions. Two outside drinking fountains in the yard will contribute much to the mechanical handling of "getting a drink" at recess time.

In the front hall a suitable bronze tablet fittingly credits the excellent judgment of the school board and superintendent and the wise and economical planning of the architects.

The total cost of the building was $176,587 and on leaving the building one feels like congratulating the Tisbury committee on their wisdom in consolidating all their scholars in one school and on giving them such a complete equipment in such a beautiful building.

SUPERINTENDENT'S OFFICE, TISBURY SCHOOL, VINEYARD HAVEN, MASSACHUSETTS

THE WASHINGTON PARK AND WILLIAM HORLICK SENIOR HIGH SCHOOLS, RACINE, WISCONSIN

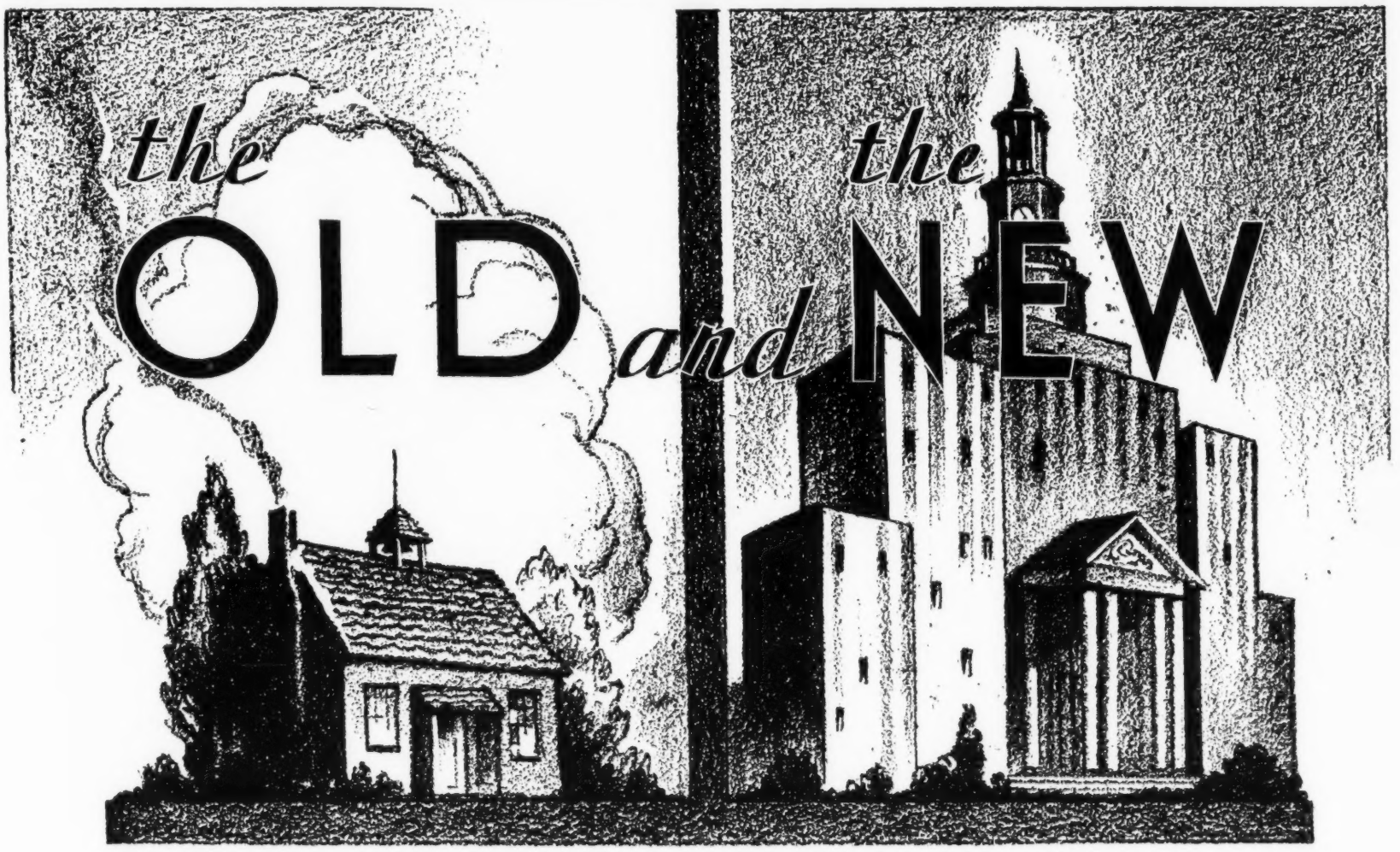
(Continued from Page 62)

There are five shops as follows: printing, mechanical drawing, woodworking, electrical construction, and machine shop. There are separate gymnasiums for boys and girls, the boys' gymnasium floor being 60 by 90 ft., the girls' gymnasium 50 by 76 ft. There are also corrective-exercise rooms, in addition to the ample number of locker rooms and showers. As in the Washington Park building, the locker rooms have an ample supply of outside light. The balcony and space under the balcony, which can be used for spectators, has a capacity of 900 to 1,000.

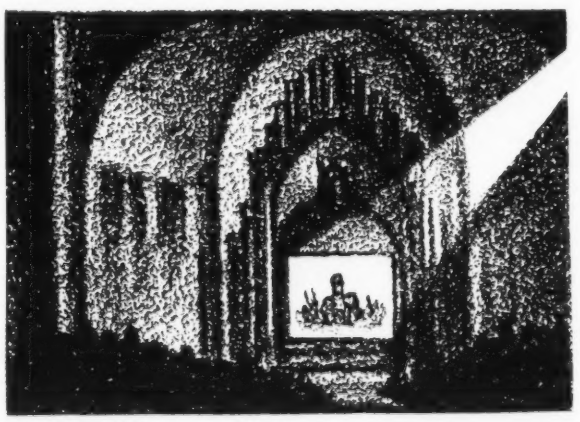
The library is 32 by 66 ft. The cafeteria is 34 by 84 ft., with a seating capacity of 300. When enrollments make it necessary to enlarge the building, it is planned to turn the present cafeteria into recitation rooms, and to construct a new and larger cafeteria to the rear of the auditorium. The normal operating capacity of the school is estimated at 775 to 800, but the building is so planned that additions can be made, without destroying its architectural symmetry. When necessary, the capacity of this building can easily be increased to 1,500 or 1,600.

As in the three junior high schools, the library is a branch of the public library, under an arrangement entered into by the library board and the board of education. Under this arrangement, the board of education furnishes the room, light, heat, janitor services, and the permanent equipment. The library furnishes the

(Concluded on Page 142)



THE FABULOUS FORCES OF THIS ELECTRICAL AGE HAVE WROUGHT A MIRACLE IN EDUCATION



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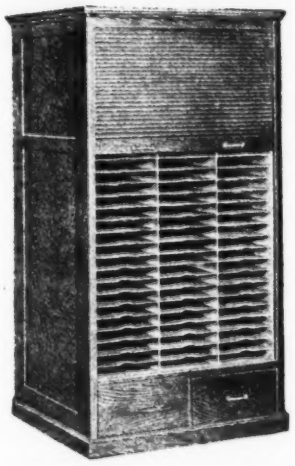

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(Concluded from Page 140)

books and employs a librarian. The William Horlick library is a branch of the public library, but the Washington Park library is strictly a school library, because of the fact that one of the city branch libraries is located a few blocks from the Washington Park site.

The cost of the William Horlick building is $555,000 and the equipment $90,000. The enrollment in the William Horlick High School for the present year 1930–31 is approximately 600 pupils. In this building, therefore, there is ample space for additional growth for several years to come.

Both buildings are complete in every detail, except that neither has an auditorium. The complete plans and specifications, however, were prepared at the time when the buildings were planned, and within the near future, both auditoriums will be constructed. As nearly as can be estimated, these auditoriums can be constructed for about $125,000 to $150,000 each.

The board of education believes that with the present facilities and the possibilities of expansion, and the addition of a third high school within a few years, its plans for caring for the future high-school growth of the city are well organized.

PUBLIC-WORKS REGULATIONS, POLICIES, AND PRACTICES AS APPLIED TO SCHOOL BUILDINGS

(Continued from Page 68)

A city school board paid $80,000 to provide a safe foundation for a high-school building after contracts had been awarded, because someone carelessly or intentionally blundered in making tests for the load-bearing values of the site.

Politics and Favoritism

Public-works appropriations, bond issues, bidding documents, bids, and contracts are directed, dominated, or manipulated in lesser or greater degree by dishonest and honest politicians and by bad and good officials, architects, engineers, contractors, manufacturers, dealers, and others who have improper and proper interests in such works.

Wise, prudent, conscientious politicians — and there are such, the popular opinion of them to the contrary notwithstanding — with the watchful coöperation and support of enlightened, alert electorates, can and do honestly and efficiently direct the execution of public-works projects in the interests of the public. Artful, unscrupulous politicians — the ones from whom the public forms the general opinion that all office holders and politicians are dishonest — backed by organizations of active henchmen and unhampered by careless electorates, secrety manipulate public-works projects. This manipulation is invariably to the detriment of such projects and to the waste of public funds. The practices of such politicians are generally known to the public, but their methods are so clever and the obligations they create are of such kind as to make the establishment of proof concerning them very difficult.

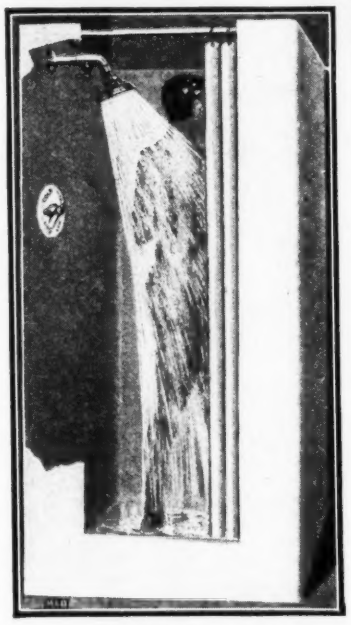
Capable, conscientious public officials and boards, and honest, competent architects, contractors, engineers, manufacturers — there are many of these engaged in the execution of public-works projects — render efficient and trustworthy service. They produce properly planned and designed buildings; they erect substantially constructed structures, and furnish materials, devices, and equipment of proper and required kind and quality, they honestly administer and conserve public funds, and they do not improperly reward friends and favorites.

The cupidity, cunning, and unscrupulousness of many men in the foregoing positions and vocations cause them to initiate and support appropriations and bond issues, and to use public funds for their financial benefit regardless of the public interest. They coöperate with, or work independently of, the dishonest politician. By collusion, influence, intimidation, favoritism, bribery, gifts, loans, secret information, and many other methods and means, they so prepare or manipulate bidding documents as to defeat real competition; they give favored bidders, manufacturers, dealers and friends safe advantages over unfavored ones in matters of materials, devices, equipment, construction methods, and qualities of workmanship; they make possible the submission of unbalanced (low) bids to be followed after contracts are awarded by "extras"; they delay the award of contracts to unfavored low bidders to annoy them; they make possible the substitution of so-called "or equal" — usually inferior — construction methods, materials, devices, equipment; they give opportunities for the performance and acceptance of inferior construction work; and they carry into effect unknown and unseen graft and corruption practices. The opportunities of rewarding favorites with such men in power seem to be unlimited.

The following operations are cited to contrast the good and bad results and to emphasize the need for eternal vigilance on the part of school boards in all public-works construction. They are:

A school board in a large city — notorious then, but not now, for political corruption and graft — under the capable, honest, leadership of its president, helped by board members and a group of competent, reputable architects, built one of the most efficiently planned, artistically designed, and substantially constructed series of school buildings in the United States. This work they carried on despite all efforts at interference by politicians.

(Continued on Page 144)



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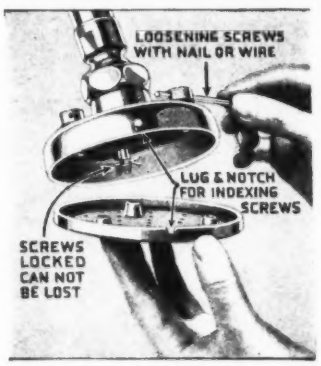

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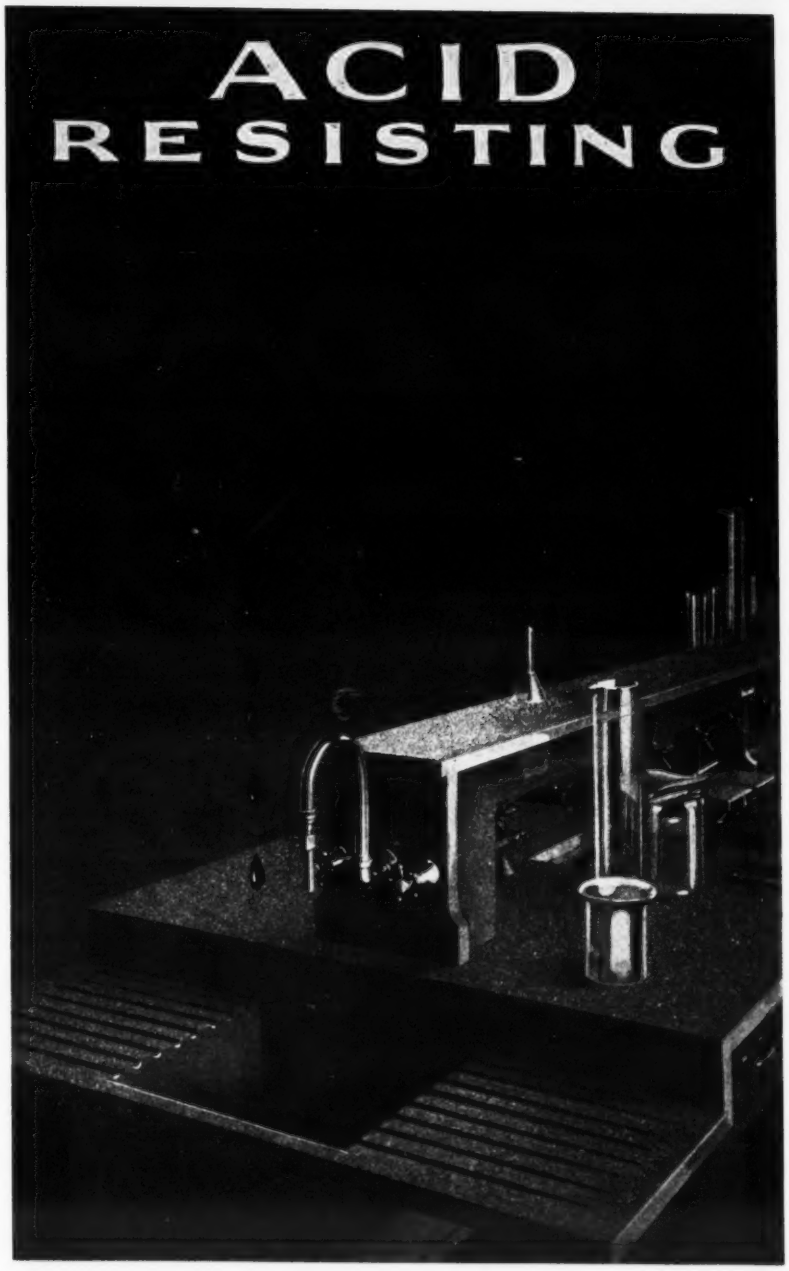

Any school board member faced with the construction, the remodeling or the maintenance of a laboratory, will find the Alberene Laboratory Bulletin, containing much general data, worth a second reading.

Our Sales Engineers have been intimately associated with the installation of practically every important laboratory built in the past thirty years. In all likelihood the problem facing you has been satisfactorily worked out in some other laboratory and a talk with us may save you time and energy. Experience has shown that first cost is actually last cost when Alberene Stone is used.

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Not a pleasant thing to contemplate — yet thousands of school officials, if put on oath, would have to admit, and thousands of others think that because they hold fire drill by the usual exit, they are preparing their children for emergency.

Records of school fires have shown conclusively that panics kill ten times as many as fire, and that fire drills are not proof against panics. When actual fire compels the use of ordinary fire escapes, children are panicky, and their fire-drill experience has not helped them.

The safe way is the Potter Tubular Slide type of escape, and a survey of owners has shown that practically all of them fire-drill once or twice a week, using the tubular slide escape for exit. In a recent South Dakota school fire, the Superintendent claims to have emptied the school in fifteen seconds.

Over 3,060 Potter Tubular Slide Fire Escapes now in use. Infringement of patents will be prosecuted.

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(Concluded from Page 142)

A reputable contractor who had previously executed public works stopped bidding after a change in the management and policy of the office handling such works. He alleged that there was discrimination in favor of certain contractors.

In the construction of a city hall for which $3,000,000 in bonds were authorized, the mayor, who later became an international figure in the world war, budgeted the funds. He instructed the architect to provide for an efficient, substantial, well-designed building at costs not to exceed the budgeted items; he awarded the contracts and strictly enforced them, and completed and equipped the hall at a cost within the bond issue. And all the work was done without public criticism or stories of favoritism, graft, or corruption.

A contractor through apparently innocent gifts and favors cleverly placed an employee of an architect's office under such obligations as to make the employee's services ineffective on work done by that contractor. Political and business pressure, it is alleged, caused a school board to approve the use of a certain material in a large building at an increased cost over another equally good, if not better, material. The same interests later forced the use of the same material in a school building for another board at a much lower cost.

A public official, when asked to employ a competent, trustworthy man, who was of the opposing political party, to do an exacting piece of public-works research work, is reported to have turned the request down. He said it would not be politically expedient to appoint a man of another party, no matter how competent he might be.

A salesman was told by an architect for a large public building that he must see Mr. So-and-So, the political boss in power, if he wanted his materials considered.

A public employee who found evidence of crooked manipulation of contracts and extras in a large public improvement was dropped from the payroll when it became known by the interested politicians that he was getting the facts.

A school board in quest of cost data for a school building called an architect into consultation and gave him the contract for planning the building conditioned on the voting up of the bond issue. The architect estimated that the building would cost $175,000, the bonds were approved, and partial construction contracts were awarded. When the work was under way, the board found that additional bonds would be needed to complete the work. These were authorized, issued, and found insufficient. The board then requested and received state aid to complete and equip the building. The final cost was approximately $375,000.

A school board threw out the bid of a contractor against whom the board members held personal grudges, because of valid irregularities in his bid. They immediately awarded the contract for another trade to a favored contractor whose bid contained the same irregularities as those of the rejected bid. This was a clear case of favoritism. A taxpayer's suit made this contract invalid.

A sincere politician of ability and integrity, who served three terms as governor of his state, followed the principle that appointees to technical positions should be qualified and experienced men — not politicians. He instructed the state architect, whom he appointed, to run the architect's office as though it were a private office, and to hire competent and fire incompetent employees. The architect, he ordered, should not allow politics to control office policies or operation; grant no favors; impartially follow a policy of fair, competition in construction contracts; produce efficiently planned, substantially and economically constructed buildings; supervise building construction and enforce contracts without favor; and, with due regard to the rights of the parties to contracts, always remember that the interests of the state are paramount and that its funds must be wisely, honestly, and economically expended. These instructions were followed and during a period of five years, with the help and backing of the Governor, more than $15,000,000 were expended in the construction of welfare, penal, orphanage, educational and other buildings and improvements. All this was done without graft or serious public criticism. In the early part of this period, pressure — political business, and otherwise — was exerted in matters of appointments; specifying of materials, construction methods, devices, and equipment; extending favors to certain contractors and interests; approvals of substitutions for specified requirements after the award of contracts; and requests of every conceivable nature inimical to the public interest. This pressure stopped when those who brought it came to realize that such methods were detrimental to their interests.

School-building practices are so much a part of general public-works procedure and regulation as to make impossible the separation of them from such governmental requirements. Hence the foregoing discussion. It will be the purpose of future papers to particularize on some of the routine steps and policies to be followed by school boards in solving their building problems.

TRENDS IN SCHOOL HEATING AND VENTILATION PRACTICE

(Continued from Page 83)

There is a slowly increasing use of oil fuel in school operation. Proper engineering advice in the application of any oil burner will very often afford such economy that the whole operation will show a

(Continued on Page 147)

STRENGTH IS SAFETY

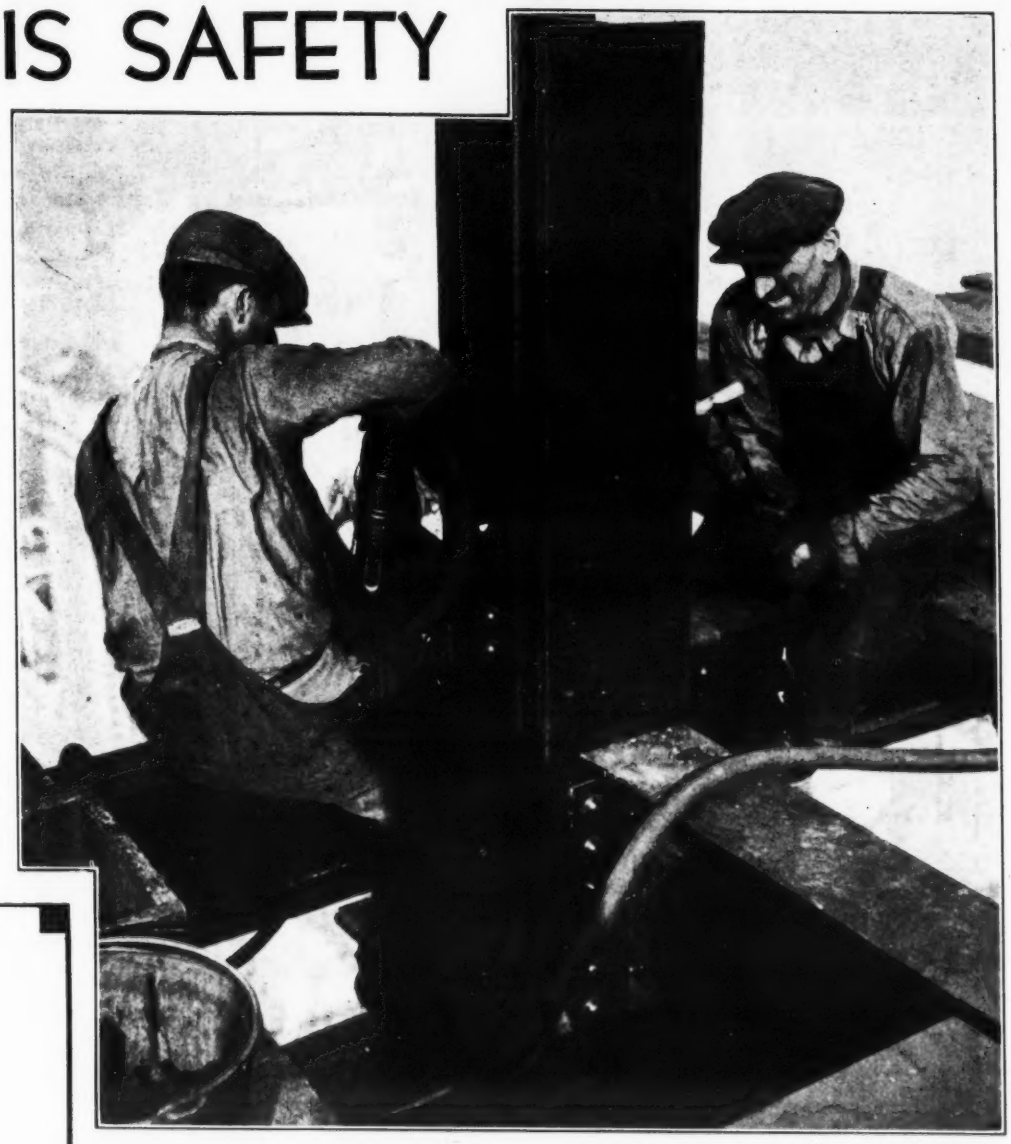

Photo by Ewing Galloway

Cash Capital
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Net Surplus
$48,796,473.07
(Accumulated over 77 Years)

Surplus to Policyholders
$72,796,473.07

Additional Funds
$40,714,883.00
(Pro rata Unearned Premiums)

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for Miscellaneous Accounts, Taxes, Dividends and Other Obligations
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Assets
Cash on hand, funds conservatively invested or current balances payable when due
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STRENGTH is the main factor in safe building construction. Every piece of steel that goes into the skeleton framework of a building must be capable of withstanding stresses and strains greater than it will ever be called upon to carry.

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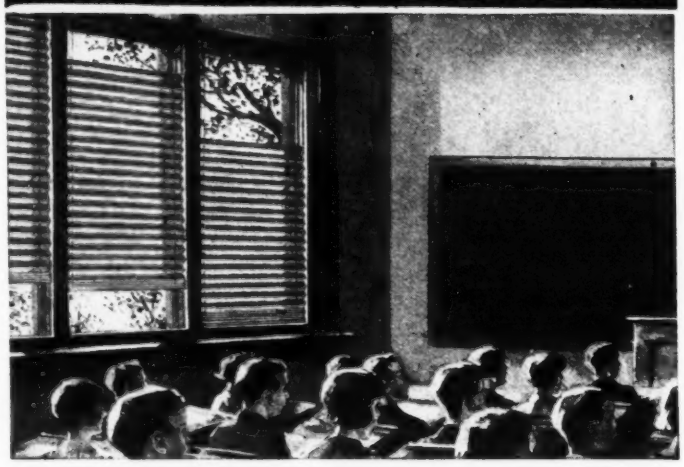

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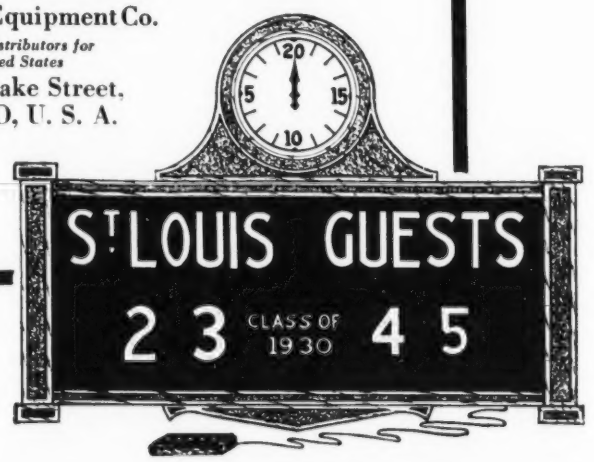

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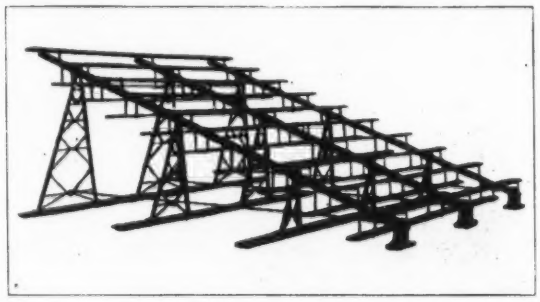

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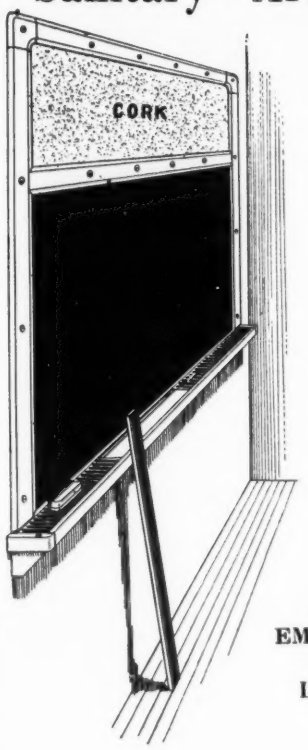

School Officials, Architects, and others who are interested in conserving the health of our school children should require the use of Dudfield's Dustless All Metal Crayon Trough complete, with metal blackboard trim in connection with all blackboards.

Trough No. 350 is the all-metal type for use in new work; No. 351 is the metal dust tray installed in wooden trough; and, No. 352 is the semi-metal type intended for remodeling work, but may be used in new work.

Where the No. 350 trough is used in connection with the No. 400 metal blackboard trim, it makes a fireproof job; and a blackboard installation that is neat in appearance and very sanitary. The Trim is installed entirely with screws, making it easy to replace broken slates without damage to walls. It will keep your schoolroom free from chalk dust which if breathed into the throat and lungs might lay a foundation for the dreaded tuberculosis germs.

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Dudfield's Dustless Crayon Trough has been specified and installed in schools in nearly every state in the Union. Protected by U. S. Patents.

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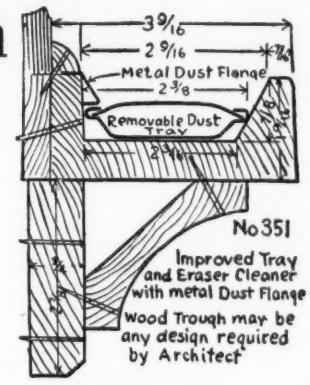
3 9/16
2 9/16
Metal Dust Flange
2 3/8
Removable Dust Tray
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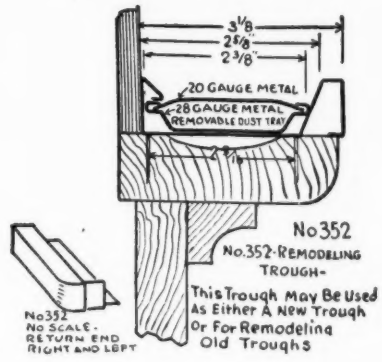
Improved Tray and Eraser Cleaner with metal Dust Flange
Wood Trough may be any design required by Architect


3 1/8
2 5/8
2 3/8
20 GAUGE METAL
28 GAUGE METAL REMOVABLE DUST TRAY
No 352
No. 352-REMODELING TROUGH-
This Trough May Be Used As Either A New Trough Or For Remodeling Old Troughs
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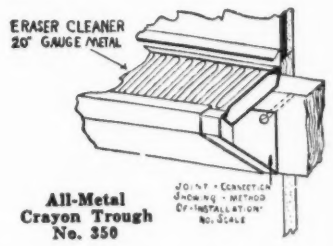

All-Metal Crayon Trough No. 350

Manufactured by

DUDFIELD MFG. CO.

116 W. KANSAS ST. **LIBERTY, MISSOURI**

(Continued from Page 144)

saving over former costs. In almost every instance, the installation of an oil burner brings such increased comfort and allied advantages that even an increase in the cost of fuel seems to be warranted in the minds of some school authorities.

In the purchase of an oil burner, or for that matter any other piece of school-building equipment, it is becoming definitely recognized that the most important consideration is the ability of the selling organization to give continuous service. Here again, the distinction must be made between promised performance and actual record of accomplishment. School administrators, unfortunately, often show a tendency to get something for nothing, with the inevitable consequences. Those equipment organizations which operate upon sound principles, know that service that is worth anything is a very expensive thing to give. They also know that there is only one place to get the cost of this service: from the purchaser of the equipment. Consequently, they add this cost to their selling price, which makes the finest opportunity in the world for those with get-rich-quick principles, to offer what they allege is the same thing, at very much reduced prices. Here the wise school administator can show whether his operations are based upon a sound knowledge of values, or merely upon his ability to read labels.

According to a report from the U. S. Bureau of Mines, contracts of a total volume of $250,000,000, were awarded in 1930, for trunk pipe lines to transport natural gas from the Panhandle and other fields to the great centers of population in the Middle West. It is possible that the East will also be supplied with this most valuable fuel.

All this forecasts a new revolution in heating practice, in the division of heat manufacture. But the revolution will only begin there, because the study of the meter records will remove many assumptions that are the basis of conclusions that make present heating practice. As a consequence, heat transportation methods and devices, and building construction to store heat more effectively, as well as administration practice to practically apply recognition of the distinction between warm-weather ventilation and cold-weather ventilation, will all receive a strong forward thrust.

If the heating plant is properly regarded as to the only function that it can perform, namely, transport heat, then a viewpoint will be established that will wipe out more differences of opinion than any other effort possible at this time. Such a viewpoint will make clear that the piping and allied devices correspond to the clutch and transmission of a fine car; that automatic temperature regulation corresponds to the self-starter and the brakes; that the radiators correspond to the wheels and tires.

But the most important result of considering the heating plant from this viewpoint, will be the instant recognition that it must be steered to accommodate the combination established by weather demand and the character of construction to store heat, precisely as a fine car must be driven at a speed suited to the combination established by the density of traffic and the condition of the highway. Such a viewpoint will make us more constructively use the energy wasted in the search for a self-steering heating plant, into constructive and united educational effort to elevate the training of everyone who has to do with the performance of a heating plant.

In 1930, two great international organizations began concerted effort to sell modifications of orifice heating. Orifice heating was first patented by Tudor of Boston, about 1881. It has taken nearly fifty years to establish any widespread recognition of the enormous value of the principles involved. Yet these principles mean to the transportation of heat, at least as much as the principle of resistance means in the transportation and distribution of electric current.

Now the successful practice of orifice heating demands the same trained skill that makes a fine surgeon. Engineers who practice in the school heating and ventilation field need this skill to operate satisfactorily. At present there is none of it, outside the great specialty organizations who have spent years and thousands of dollars to acquire this skill. The school consultant should not hesitate to add the skill of these great organizations to his own.

There is a steadily increasing use of pneumatically operated valves, with remote control from a central point, to better steer the heating plant. In this one section of the field alone, there are great possibilities of lowered first cost in application, greater comfort to the occupants, and decreased fuel costs from the elimination of wasted heat.

Unit Heaters

The unit heater is the motor truck of heating. Its function is to deliver wholesale quantities of heat over extensive areas, with little or no regard to sounds, and with no regard to ventilation, except as an occasional incident. If reasons of economy forced school administrators to haul pupils in vehicles improvised from old motor trucks, instead of using properly designed coaches or busses, the resulting discomfort would be accepted without libeling the trucks for their particular field of operations. The same understanding of the true functions of a unit heater will permit the advantages of its economies, when necessary, without detrimental conclusions as to its value in its own especial field.

In the division of storage of heat, there exists the greatest possibilities for improved heating and ventilation practice. There has been an accelerating growth of recognition of the importance of building insulation. But it begins to be apparent that human element in fabrication is of at least equal importance in building insulation, as the skill of the cook in the preparation of fine foods.

A Microscope for School Laboratories

The B & L Microscope FS finds its chief application in the laboratories of secondary schools. It has the same sturdy build and mechanical andoptical precision of the more complete laboratory instruments. The difference lies in the optical equipment available. This consists of a 10X and a 45X objective together with a 5X and 10X eyepiece. The 10X eyepiece is divisible, making a 4X objective with the lower element removed. Thus a range of magnifications from 20X to 430X is available.

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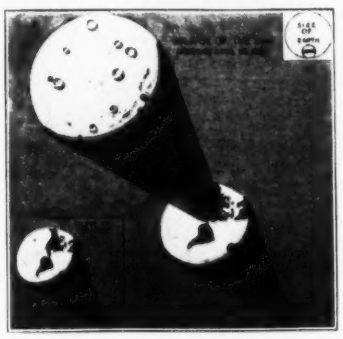

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KEYSTONE VIEW COMPANY
MEADVILLE, PA.

The test of any structure to store heat, reasonably, is to shut off the heat on a zero day, and then note the drop in temperature, within it, from 70 degrees. When school administrators begin to apply this test upon every school building in their charge, with intelligent study of the resulting data, we shall have a new conception of heating practice, with an entirely new field of operations for consultants of sufficient vision to prepare themselves to practice in it. To succeed in this field or to succeed in their present field, consultants must quit writing specifications that automatically center upon the contractor, authority that should reside solely in the consultant.

The usual defense for this practice is that the consultant's fees are not adequate for him to carry his load of responsibility. This defense labels those who use it very undesirably, as lacking in business sense.

The first law of business is, "Get adequate pay for every responsibility carried." If consultants fail to get adequate pay, it is only because they fail to recognize the true value of what they have to sell. Since knowledge of values is the only sound basis for selling success, the consultant's first duty is to educate himself to the great value of what he has to sell. When he does this, he will have no trouble to convince clients of the worth of his services.

The year 1930 marks such an advance in understanding in school heating and ventilation practice, as to promise a tomorrow of service of greater value, than the experience of yesterday has built into the very valuable practice of today.

SCHOOL-BUILDING PROGRAMS

(Concluded from Page 102)

California

Huntington Park. During the year 1931, the school board contemplates the erection of one primary unit, at a cost of approximately $25,000. No building projects are at present under construction. C. L. Johns, superintendent of schools.

Santa Barbara. During the next year, the school board will erect three school buildings, consisting of two elementary schools, and one junior high school, at a total cost of approximately $800,000. The school board has under construction additions to two existing buildings, to cost $75,000. No bond issue is contemplated. Eldon Ford, assistant superintendent of schools.

Massachusetts

West Medford. The school board has under construction one elementary school costing $125,000. An appropriation of $125,000 has been made for another elementary school in the West Medford district. J. S. Kadesch, superintendent of schools.

Revere. During 1931, the school board will build an addition to one of the schools, at a cost of approximately $100,000. Bond issues for 1931 for school-building purposes will approximate $100,000. The school board is completing an addition to a school, at a cost of $152,000. Carl F. Lindstol, superintendent of schools.

Michigan

Saginaw. The school board has under construction two elementary schools. The Fuerbringer School will be erected at a cost of $138,000, while the Sixteenth Street School will cost $125,000. All buildings are erected under the pay-as-you-go plan, without the necessity of bond issues.

Minnesota

St. Paul. The school board contemplates a new building program for the year 1931, which comprises a school for crippled children costing $185,000; an addition to the Groveland Park School costing $60,000; and an addition to the Mattocks School costing $60,000. The school board has under construction the Harrison Grade School, to be completed at a cost of $103,000, the Horace Mann School, to be completed at a cost of $65,000; an addition to the Harding High School, to cost $152,000; and an addition to the Murray Junior High School, to cost $80,000. J. W. Smith, statistician.

New Jersey

Leonardo. The school board has outlined an extensive school-building program, involving an expenditure of $465,000. Two new elementary schools, and an addition to an existing structure, have been recently completed. Construction work has been started on a 12-room grade school, and a gymnasium building for the high school. W. M. Petingale, business manager.

North Carolina

High Point. The school board contemplates the erection of a junior high school, at a cost of $360,000 to $400,000 early in 1931. The board has completed the erection of an elementary school and a colored high school, at a cost of $160,000. T. W. Andrews, superintendent of schools.

Pennsylvania

Sunbury. The school board recently completed the erection of a school building. Another school now under construction, will be completed during the year 1931–32. No bond issue is proposed for the year 1931. J. E. Shambach, superintendent of schools.

Texas

Sherman. At a recent school-bond election, the voters approved a bond issue of $90,000 for school-building purposes. L. T. Cook, superintendent of schools.

Laredo. The school board contemplates the erection of a senior high school in 1931, at a cost of approximately $250,000. The voters will be asked to approve a school-bond issue, and construction work will start about May 1. W. P. Galligan, superintendent of schools.

Washington

Seattle. During the year 1930, the school board will carry out four school-building projects, comprising a girls' parental school, an elementary school, a junior high school, and an addition to the Lincoln Senior High School, at a total cost of $1,345,000. The board has completed plans for a 12-room addition to an elementary school, and the erection of a 9-room school, which will be financed from a bond issue of 1929. At present the school board is completing additions to three existing units, comprising a vocational school, and two elementary units, at a cost of $343,000. W. V. Smith, assistant superintendent of schools.

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Clearfield's School Adventures—V

Mark Wright, Member of the School Board, Clearfield

The School Site

At frequent intervals during the past several months, our superintendent of schools has submitted reports of pupil enrollment in Clearfield. These reports have indicated a steady increase in enrollment. One recent report showed that the average annual increase in enrollment for the past five years has been approximately one hundred.

His latest report revealed clearly the fact that our elementary-school buildings are filled to capacity. In fact, two elementary-school buildings stood revealed as overcrowded. In one of these buildings, the recent growth in enrollment forced the fitting up of a classroom as a temporary measure in one of the end corridors. In the other building, a classroom in the basement had become a necessity. These facts led us to agree with the superintendent's recommendation that additional housing facilities must be furnished for the next school year.

If a further factor in bringing us to this conclusion seemed necessary, it was furnished promptly by the filing of definite and persistent complaints from individual parents and from the local parent-teacher association. These complaints stressed repeatedly the fact of Clearfield's ability to pay for additional school-housing facilities as evidenced by the rapid increase in real estate values. Indeed, these complaints hinted further that Clearfield could ill afford to ignore the situation if permanent blessings were to result from these recent increases in real estate values.

Superintendent Graham's report showed, not only the overcrowded conditions of our present elementary-school building, but also the geographical distribution and location of these buildings. This distribution seemed to argue pointedly that the remedy should be sought in the erection of a new building on a new site rather than in any additions at this time to our present buildings. Several facts supported this conclusion. At least one of our present buildings could not justify the erection of additional classrooms because it had not been planned so as to favor an addition, and the limitations of its site made the proposition still less feasible. Furthermore, the total lack of school facilities in the Ridge Road section of town necessitated the expenditure of large amounts of tax money annually for the transportation of school children from this section. A school building in the Ridge Road area would eliminate these transportation costs and would at the same time, because of its general location with reference to our other schools, relieve entirely the unsatisfactory conditions prevailing in the two of our schools now overcrowded.

As soon as the fact became known generally that a school site in the Ridge Road section would be a real advantage, one of that section's real estate developers offered three acres of land free as a site for the proposed school.

The generosity of this real estate developer appealed strongly to several members of the board. He suggested that the board go with him to view the site he proposed. Accordingly such a trip was arranged. The site proved to be located about eleven hundred feet from the established highway and approximately one hundred feet lower than the highway. Immediately adjoining the site was an eleven-acre swamp tract. The higher and dryer section between the highway and the proposed school site was already marked out as building lots, although as yet no roads had been made. After expressing the thanks of the board for the interview, Sam Jones, our chairman, suggested that we meet in special executive session that evening.

As soon as this evening meeting was called to order, Mrs. James requested that the opinion of the superintendent of schools be heard. Superintendent Graham called our attention to the fact that while the site offered cost nothing in itself, it might prove expensive as a site on which to construct a schoolhouse. He based this suggestion on the following considerations: No road leads to the site at present; the construction of eleven hundred feet of road, especially on a steep grade, will be somewhat expensive; and adequate drainage for this particular site, situated so close to a large swamp, may prove very costly if at all possible. And besides, he said, a three-acre site cannot be considered adequate for the initial unit of a school building in a rapidly developing outlying section of the town. He suggested also that the town engineer be requested to estimate the cost of the necessary drainage and road building to the site under consideration, and that in the meantime the relative worth and costs of other sites be considered.

Then Sam Jones, our board chairman, made a suggestion just before he adjourned the board meeting. He suggested that Superintendent Graham prepare for the guidance of the board members a list of those qualities which are essential in a good school site.

Superintendent Graham's report as submitted at a recent board meeting is as follows: "The question of a suitable school site is rarely easy of solution. The location of a new school building usually involves many considerations. The public demands convenience and safety of access, but does not always consider costs, the general growth of the community, and the trend of school population.

"A site that is ample today may be woefully inadequate ten years hence. One location may offer more seclusion and safety than another. mination of the school needs, conveniences, and mination of the school needs, conveniences and comforts both for the present and for the next ten or twenty years?

"One essential factor is the present and probable future immediate environment of the proposed school site. The question of locating a schoolhouse recently came into public discussion at Tulsa, Okla. An editor rose in that city to remark that the Central High School is located where no school should be located ten years from now. In a very few years this school is going to find itself situated in the very heart of the throbbing commercial activities of this fast-growing town.

"Another important factor, and one not to be overlooked, is that of ample space for future expansion and for playgrounds. Our modern youth must have plenty of room for such play as has become a definite aid to the development of adequate physical stamina. A three-acre site such as that offered free at Ridge Road is not sufficient. To be adequate for the future, the Ridge Road site should embrace from six to eight or even ten acres.

"The problem resolves itself into one in which the expansion of the community population, the trend of real estate development, and the present and future needs of the school community become the controlling factors.

"The essential qualities of a school site include the following eight items:

1. *Adequate size*
   a) For building and future extensions.
   b) For proper setting and removal from the street.
   c) For physical education and outdoor games.
2. *Orientation of building.* Most classrooms should have sunlight part of the day. This is best obtained if long axis of building extends north and south.
3. *Freedom from noise and odors.*
4. *Suitability for construction.* Avoid low, filled and wet land. Avoid abrupt changes in grade.
5. *Safety.* Not on thoroughfares; especially elementary schools.
6. *Healthfulness.* Fresh air, sunlight, and freedom from noise.
7. *Reasonable centrality.* Exact centrality is not as important as other factors.
8. *Reasonable accessibility.*"[1]

We did not accept the free site next to the swamp at the foot of the hill. Instead, we paid $6,000 for eight acres of well-drained, level land about two hundred feet from the highway and on the highway level. It will provide a community playground.

[1]Committee on Schoolhouse Planning, N.E.A.

BOOK REVIEWS

Biblical Information in Relation to Character and Conduct

By Pleasant R. Hightower, Ph.D. Paper, 72 pages. University of Iowa, Iowa City, Iowa.

This is another book in the series of Character Studies being conducted at the University of Iowa. The object of the study was to show some relationship between Biblical information and conduct. No connection of any consequence was brought to light by the experiment. The book is interesting chiefly as a study of the tests which were given.

Burton Holmes Travel Stories

Edited by William H. Wheeler and Burton Holmes. Cloth, 408 pages. Published by Wheeler Publishing Company, Chicago, Ill.

Who has not been charmed by the Burton Holmes lectures? This particular volume deals with China. While Burton Holmes has gone farther into the interior of China and captured more odd, strange, and interesting pictures than any other traveler, his colaborer, Mr. Wheeler, looked after the descriptive material in an instructive manner.

The text provides wonderful travel reading. The book abounds, as this may be expected, with a marvelous array of illustrations.

Life Guidance Analysis

Prepared by Walter MacPeek. Issued by the Guidance of Youth Bureau, Washington, D. C.

An analysis sheet for determining occupations suitable for pupils after leaving school. The questions deal with an analysis of interests, traits, and tendencies as they affect the choice of a lifework and occupational possibilities. The last part of the sheet contains a list of the well-known occupations and professions.

Gray Kitten and Her Friends

By Norman H. Hall. Paper, 64 pages. Hall & McCreary Company, Chicago, Ill.

A story reader for beginners.

Shakespeare's King Lear

Edited by A. G. Schmidt and M. A. Feehan. Cloth, 279 pages. Price, 44 cents. Loyola University Press, Chicago, Ill.

This attractive edition of *Lear* is edited for advanced high-school reading. In addition to biographical notes and a general appraisal of the play, it contains excellent character sketches of Lear, Cordelia, Edmond, etc. It is suggested that in the next edition the editors use the newer type of review questions.

Physical Education

By N. P. Neilson and Winifred Van Hagen. Cloth, 381 pages. Price, $2. A. S. Barnes & Co., New York.

This book is a development of the authors' graded manual of physical education for the rural schools of California. Whether we agree with all the educational philosophy of the authors or not, the program of activities which they provide must win admiration for its completeness and practical utility. The book is fully illustrated and contains a wealth of practical teaching aids, devices, cautions, and organization helps.

(Concluded on Page 153)

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Public Elementary School Plant. *Charles L. Spain, Deputy Superintendent of Public Schools, Detroit, Michigan, Arthur B. Moehlman, and Fred Watson Frostic, Superintendent of Schools, Wyandotte, Michigan.*

Here are considered the problems of designing and equipping the elementary school in accordance with curricular and administrative needs. $4.00

OTHER BOOKS

Public School Relations. *Moehlman.* $2.00
Public School Finance. *Moehlman.* $3.00

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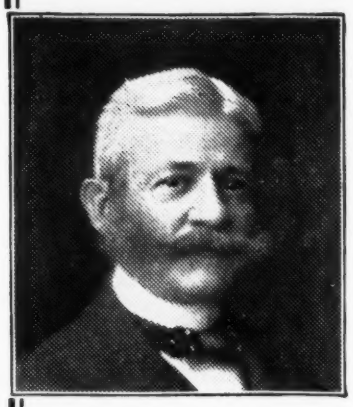

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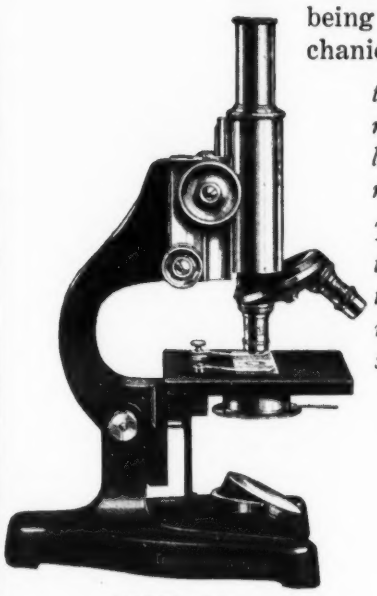

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(Concluded from Page 150)

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Agricultural Nature Study

By John H. Gehrs. Cloth, 184 pages. Published by the American Book Company, New York.

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Air Travel

By James E. Mooney. Cloth, 327 pages. Price, $1. Charles Scribner's Sons, New York, N. Y.

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The Curious Car

By Lillian K. Craig. Cloth, 94 pages. Price, 88 cents. Published by the Bruce Publishing Company, Milwauukee, Wis.

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Modern Latin Conversation

By George Copellanus, Ph.D. Cloth, 164 pages. Price, $1.16. Published by The Bruce Publishing Company, Milwaukee, Wis.

This book is a translation made from the German by Bertrand F. Kraus, M.A. The excellence of the work appealed to the translator who recognized the fact that the ancient prejudice is dispelled when one reads the refreshing exercises presented by Copellanus.

Cæsar's wars, Cicero's eloquence, and Vergil's story of Æneas give place to a conversational Latin, and the terms used are as far removed from the conventional Latin book as our mode of living differs from Cæsar's. The author selects his phrases from the daily experiences of the student. He has constantly kept in mind the type of question and answer of interest to the young student, and as a result, the material suggests the free, easy conversational style of students.

The first lesson presents the English and Latin expressions for such typical phrases as: "Do you know Latin?" "Oh, so, so." "Do you understand what I say?" "I don't understand a single word." Other lessons develop various scenes with which any pupil is familiar. There is a breakfast, lunch, and dinner served, with some rules of etiquette pointed out, a music celebration, a walk, a trip, playing games, conduct at school during study time and leisure hours, listening to the radio—a wealth of familiar activities which the young Latin student is going to enjoy learning.

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Dietetics and Nutrition

By Maude A. Perry. Cloth, 332 pages. Price, $2.50. C. V. Mosby Co., St. Louis, Mo.

This book, addressed to nurses, teachers, and adult readers, presents the important facts on food and diet in rather detailed style. The author holds rightly that a thorough knowledge of the fundamentals of the normal diet are essential not only to the individual who desires to maintain his health during all periods of life, but that it is also vital for constructing and following therapeutic and corrective diets.

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By Hugh Hartshorne and Mark A. May. Price, $2.75. The Macmillan Co., New York.

The results of this elaborate study are confusing and do not seem to lead to usable conclusions.

The Play of Imagination in Geometry

By David E. Smith and Aaron Bakst. Paper, 21 pages. Price, 25 cents. Electrical Research Products, Inc., New York, N. Y.

This handbook is designed to be used in connection with the educational talking picture and has been prepared with the coöperation of Dr. David Eugene Smith, an eminent authority on mathematics. The booklet will be found useful by teachers who find difficulty in developing the interests latent in the subject. It is believed that a student in geometry may gain a broader view of the subject, with more and better training in the grasp of a proposition than is possible from the classical training in proving the various theorems in geometry.

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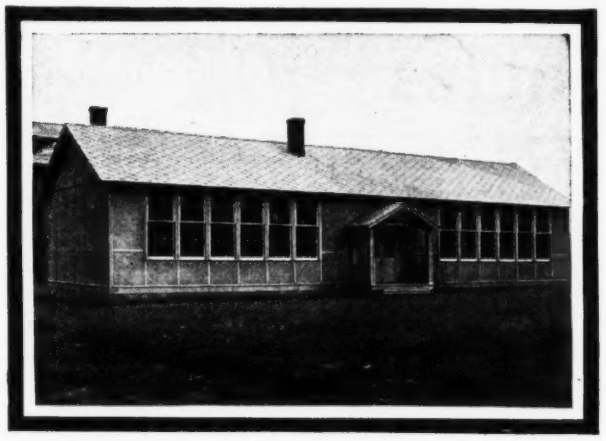

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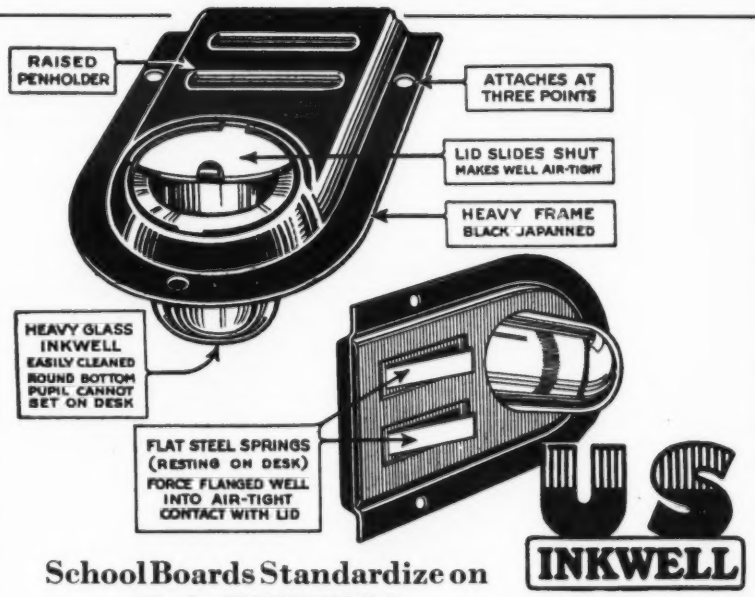
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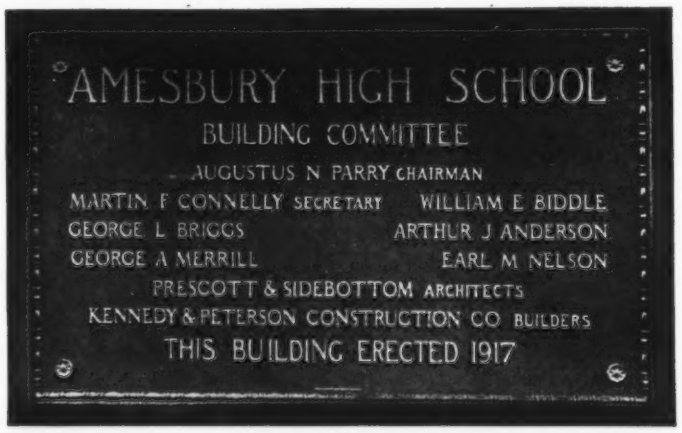

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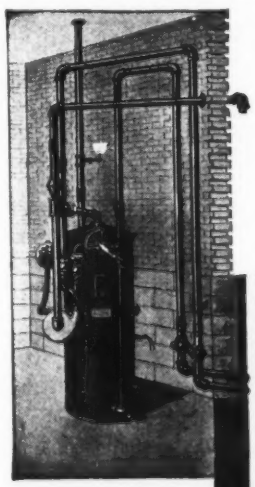

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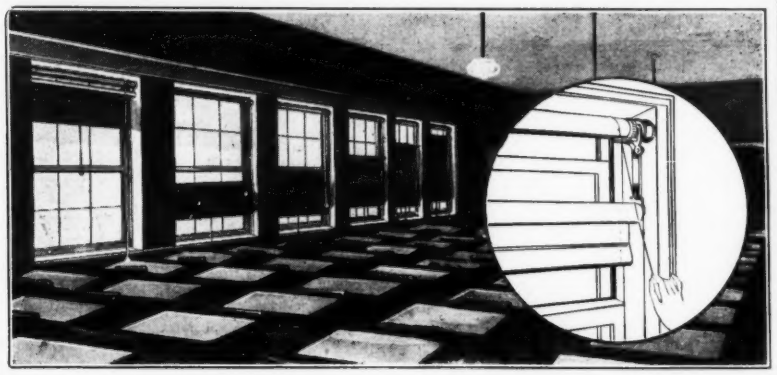

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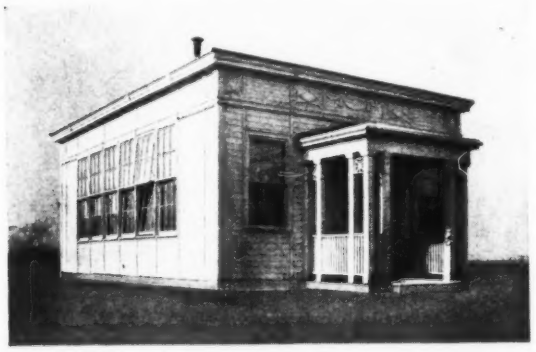

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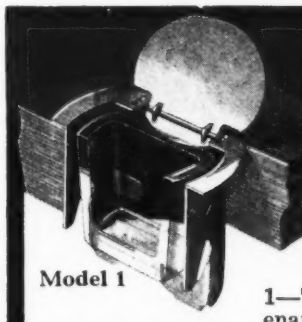

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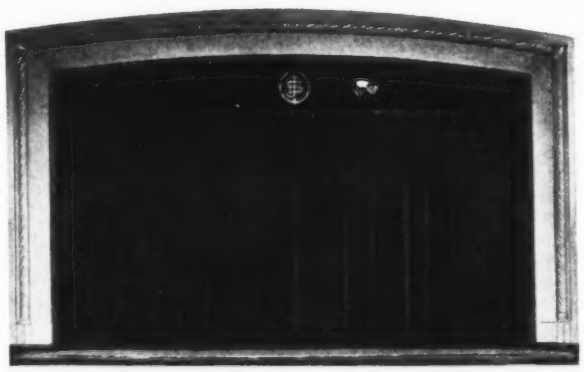

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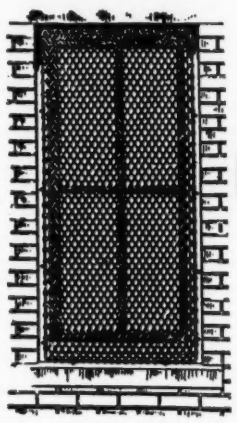

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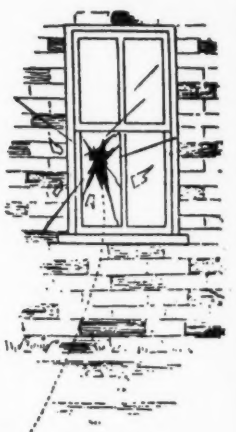

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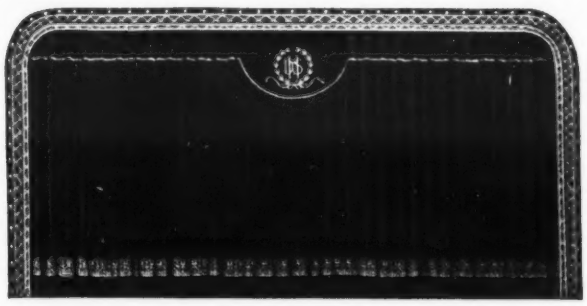

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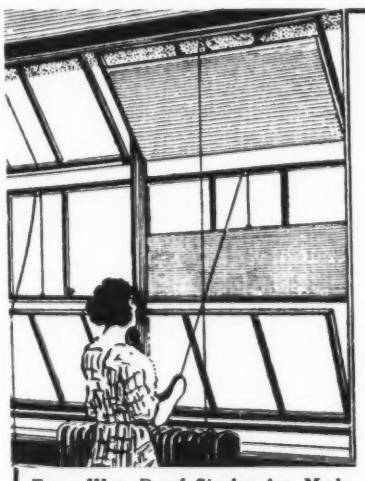

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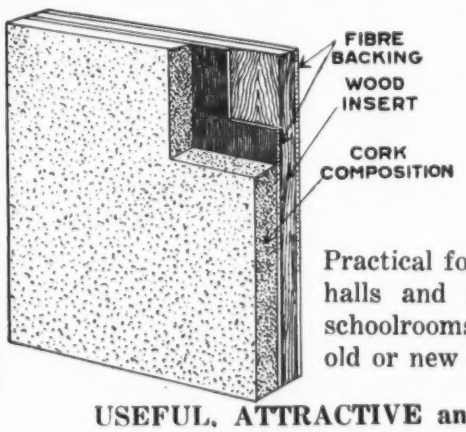

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PAINT SPRAYING EQUIPMENT
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(Continued on Page 163)

Publications of Manufacturers

The following list of manufacturer's catalogs, and specification data, is published as a convenient guide for school officials and schoolhouse architects to sources of information covering products used in the construction and equipment of school buildings.

ALBERENE STONE. A 26-page booklet including information and specification data on Alberene Stone for laboratory equipment, shower partitions, stair treads, etc. The Alberene Stone Company, 153 West 23rd St., New York, N. Y.

MAKE WALKWAYS SAFE. An instructive folder on the use of Anti-Slip products on school stairways with specificational details. American Abrasive Metals Company, 50 Church St., New York, N. Y.

LOCKERS AND CABINETS, Catalog No. C-28. Includes complete specification data for A. S. E. Steel Lockers and Cabinets. Also photographs of typical installations. All-Steel-Equip Company, Inc., Aurora, Ill.

UNIVERSAL HEATING AND VENTILATING UNIT, A.I.A. No. 30d11. Publication 212. A 32-page booklet that covers its subject very thoroughly. Contains complete drawings and specification data for the Universal Heating and Ventilating Unit. American Blower Corp., Detroit, Mich.

CLEAN AIR. Descriptive literature covering the service of American Air Filters and their uses in schools. The American Air Filter Company, Inc., 108 Central Avenue, Louisville, Ky.

SCHOOLROOM POSTURE AND SEATING. A series of 15 authoritative booklets on schoolroom posture and seating available. Also classroom posture poster on seating, 17½ by 25 inches. Catalog No. 260 containing complete information on classroom and auditorium seating. The American Seating Company, 14 East Jackson Blvd., Chicago, Ill.

ANCHOR SCHOOL FENCES. A complete catalog of Anchor school fences with specifications, drawings, and other data covering Anchor Fences. Anchor Post Fence Company, Eastern Avenue and Kane Street, Baltimore, Md.

ATHEY SHADES AND WEATHER STRIPS, A.I.A. 28e and 35P6. Two very complete catalogs of informational data covering the specification and installation of Athey Shades and Athey Weather Strips in schools. The Athey Company, 6035 West 65th Street, Chicago, Ill.

AUSTRAL MULTI UNIT SCHOOL WARDROBE, A.I.A. 28B 33. Complete description, drawings, and specifications of the Austral Multi Unit School Wardrobe. The Austral Window Company, 101 Park Avenue, New York, N. Y.

AUSTRAL WINDOWS. A descriptive folder on the value of proper window ventilation as secured through Austral Windows. This folder includes the annual report of the schoolhouse department of the city of Boston. The Austral Window Company, 101 Park Avenue, New York, N. Y.

BUCKEYE HEATOVENT SYSTEM OF UNIT HEATING AND VENTILATING, A.I.A. No. 30-d11. Bulletin No. 124. This is a complete presentation with detailed specifications covering the advantages of Buckeye products, dealing particularly with the 900 Series Buckeye Heatovent. A.I.A. File No. 30-d11, Bulletin No. 126, contains complete specifications and engineering data on the No. 100 Series Buckeye Heatovent. The Buckeye Blower Company, 400 Dublin Avenue, Columbus, Ohio.

BUTLER TUBULAR FIRE ESCAPE. A folder covering the advantages of Tubular Fire Escapes for schools, with photographs and information covering a typical school installation. The Butler Mfg. Co., Kansas City, Mo.

CARTER BLOXONEND FLOORING. A descriptive folder with specification details showing the application of Bloxonend Flooring in schools. Carter Bloxonend Flooring Company, 902 Walnut Street, Kansas City, Mo.

LESS NOISE — BETTER HEARING, A.I.A. File No. 39-b. A 48-page booklet of sound-insulation data illustrating the leading installations of Acousti-Celotex in schools. The Celotex Company, 645 North Michigan Ave., Chicago, Ill.

THE AIRWAY TO EFFICIENCY. A 12-page booklet with detailed information on Sani-Dri Air-Drying Machines for school washrooms, swimming pools, etc. Chicago Hardware Foundry Company, 1516 Merchandise Mart, Chicago, Ill.

CLOW PLUMBING FIXTURES. A 412-page catalog illustrating and fully describing the Clow complete line of plumbing fixtures. James B. Clow and Sons, 201–99 North Talman Avenue, Chicago, Ill.

FLOOR RESEARCH. A treatise on the treatment and maintenance of floors of all kinds. The Continental Chemical Corporation, 404 Scott Ave., Watseka, Ill.

FACTS YOU SHOULD KNOW ABOUT RESILIENT FLOORS FOR SCHOOLS. An authentic treatise on the subject of floors and particularly resilient floors. Contains a series of charts for guidance in the selection of floors, best suited for certain areas in schools. Also a new catalog showing complete line of floor coverings reproduced in color. Congoleum-Nairn, Inc., Kearny, N. J.

PLUMBING EQUIPMENT FOR SCHOOLS. A 60-page catalog presenting the Crane plumbing equipment for schools. Features a number of floor plans for modern junior high schools. The Crane Company, 826 South Michigan Avenue, Chicago, Ill.

FENESTRA WINDOWS, A.I.A. No. 16e1. Contains complete specifications, data and drawings on the proper installation of windows in all parts of the school building. Of special interest to architects. Detroit Steel Products Company, 2250 East Grand Blvd., Detroit, Mich.

DRAPER ADJUSTABLE WINDOW SHADES, Catalog No. 20. A 22-page booklet of information on the shading of school windows, with complete data for the specification and installation of Adjustable Window Shades. Luther O. Draper Shade Company, Spiceland, Ind.

DURABILT STEEL LOCKERS, A.I.A. File No. 28a-1. A loose-leaf catalog containing complete and comprehensive information on the installation of steel lockers for all purposes, steel storage and wardrobe cabinets, steel gymnasium racks and trucks. The catalog covers in complete detail the installation of lockers in every part of the school building. Detailed locker specifications and architects drawings for convenient reference are included. The Durabilt Steel Locker Co., 400 Arnold Ave., Aurora, Ill.

SOLVING GYMNASIUM STORAGE PROBLEMS, A.I.A. No. 28a-1. A new booklet just published. This is a complete treatise on the gymnasium storage problem. It illustrates the various types of lockers and cabinets necessary to solve the gymnasium storage problem with information covering their use. Detailed drawings, floor plans, and complete specifications are included. The Durabilt Steel Locker Co., 400 Arnold Ave., Aurora, Ill.

THE FORSE WEARPROOF WINDOW SHADES. An attractive catalog featuring complete data and installations of Forse Window Shades. The Forse Manufacturing Company, Anderson, Ind.

GILLIS AND GEOGHEGAN ASH HOIST. A 24-page booklet illustrating G & G Telescopic Hoists with complete installation data. Gillis & Geoghegan, 551 West Broadway, New York, N. Y.

CELESTIALITE LIGHTING GLOBES. A 24-page booklet fully illustrating Celestialite lighting globes with data for their specification in schools. Gleason-Tiebout Glass Company, 200 Fifth Avenue, New York, N. Y.

H & W SCHOOL FURNITURE. School seating for classrooms, auditoriums, in new design and finish fully illustrated and complete description with photographs of installations in schools. The Heywood-Wakefield Company, Boston, Mass.

THE HORN ACCORDION FOLDING PARTITION, Portfolio K. A.I.A. No. 19e61. Description and working drawings arranged in handy, loose-leaf style. Horn Folding Partition Co., Fort Dodge, Iowa.

QUIET PLEASE, A.I.A. No. 39b. A booklet which includes data, drawings, and specifications for Acoustex, a new decorative sound absorbent. The Housing Company, Boston, Mass.

THE LIGHTING OF SCHOOLS. A 24-page booklet, fully illustrated, serving as a guide to the solution of lighting problems in schools. The Holophane catalog, 48 page booklet is a combination catalog and engineering data book. The Holophane Company, 342 Madison Avenue, New York, N. Y.

MODERN FLOORS — THEIR MAINTENANCE. A very thorough booklet on the subject of floor maintenance, covering all types of flooring. The Hillyard Chemical Company, St. Joseph, Mo.

JOHNSON HEAT AND HUMIDITY CONTROL. An 80-page booklet of detailed information covering the Johnson System of Heat and Humidity Control with specification and installation data. Johnson Service Co., 149 East Michigan Street, Milwaukee, Wis.

SEALAIR IN-SWINGING WINDOW. KAWNEER WELDED DOORS, A.I.A. No. 16a1 and 16d3. Details and specifications of interest to architects. Arranged in handy loose-leaf folder. The Kawneer Company, Niles, Mich.

THE KEWAUNEE BOOK OF LABORATORY VOCATIONAL AND HOME-ECONOMICS FURNITURE. An encyclopædia of information on the planning and equipment of the science laboratories, vocational and home-economics departments. Comprehensive floor plans and shop layouts included with additional information covering every type and kind of equipment for these departments. 455 pages. The Kewaunee Manufacturing Company, Kewaunee, Wis.

THE KEWAUNEE BOOK OF LIBRARY FURNITURE. A 55-page booklet illustrating a complete line of library furniture with layouts and data on the planning and equipping of libraries. The Kewaunee Manufacturing Company, Kewaunee, Wis.

KEWANEE BOILERS. A series of highly technical booklets on the installation of Kewanee Boilers, featuring specification data and drawings. Kewanee Boiler Corp., Kewanee, Ill.

KEWANEE IN SERVICE, A.I.A. No. 30c. An elaborately illustrated booklet of 128 pages showing hundreds of schools in all parts of the country equipped with Kewanee Boilers. Kewanee Boiler Corp., Kewanee, Ill.

KIMBALL LABORATORY AND VOCATIONAL FURNITURE. An attractive book showing complete line of furniture and equipment. Includes a series of interesting floor plans. 255 pages. W. W. Kimball Company, 306 S. Wabash Ave., Chicago, Ill.

LYON METAL PRODUCTS. A series of folders and booklets on steel lockers, cabinets, and shelving for the schools, as well as on the Lyon new line of steel folding chairs. Standard filing size. Lyon Metal Products, Inc., Aurora, Ill.

MEDART CATALOG L-3. A very complete catalog of gymnasium equipment featuring an amount of valuable material on the planning of a gymnasium. Fred Medart Mfg. Co., St. Louis, Mo.

MULTI-SELECTO PHONOGRAPH. Loose-leaf pages covering installation instructions for Multi-Selecto school broadcast system. Multi-Selecto Phonograph, Inc., Educational Department, Grand Rapids, Mich.

MURDA PROGRAM CLOCK SYSTEM. A number of folders covering specification data and other information on Murda Program Clock Systems. Folder on signal equipment for schools and school telephone systems included. Murphy-Davis Signal Company, 631 Jackson Street, Topeka, Kans.

GYMNASTIC APPARATUS, Catalog F16. A very complete catalog containing much valuable information on gymnasium planning, layout and the installation of gymnasium equipment. Narragansett Machine Company, Providence, R. I.

JENNINGS PUMPS. A series of bulletins covering the various services and uses of Jennings Pumps in schools. The Nash Engineering Company, 11 Wilson Road, South Norwalk, Conn.

NATIONAL SCHOOL EQUIPMENT. An attractive well-arranged catalog covering a complete line of school furniture. The National School Equipment Company, Port Washington, Wis.

NATURAL SLATE BLACKBOARDS. Two booklets describing Natural Slate Blackboards and containing data, specifications, and an interesting story of their quarrying and finishing. Natural Slate Blackboard Company, 1140 Robinson Ave., Pen Argyl, Pa.

THE HERMAN NELSON SYSTEM OF VENTILATION, A.I.A. No. 30d1. An elaborate 100-page booklet presenting the story of the history and science of ventilation, as well as detailed informa-

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tion featuring the new Herman Nelson System of Ventilation. Detailed drawings, engineering data, and specifications provide all the essential information necessary for the planning and installation of Herman Nelson System of Ventilation in schools. The Herman Nelson Corp., Moline, Ill.

THE NORCOR LINE. An elaborate catalog containing specifications and illustrations of a complete line of folding chairs. Northern Corrugating Company, Inc., Corner Bridge and Pearl Sts., Green Bay, Wis.

NORTON FLOORS. A number of booklets covering the different kinds of nonslip flooring, such as Alundum tile, treads, and aggregates. The Norton Company, Worcester, Mass.

PUBLIC SCHOOL SEATING, Catalog No. 30. Covers an extensive line of school furniture, folding chairs, and opera chairs. Includes a typical seating plan for a modern schoolroom. The Peabody Seating Co., North Manchester, Ind.

PEERVENT. Containing specification data describing and illustrating the Peervent heating and ventilating unit, and Peervent systems of ventilation. The Peerless Unit Ventilation Company, Bridgeport, Conn.

LABORATORY AND LIBRARY FURNITURE. A compact 160-page catalog covering a complete line of equipment, featuring several pages of specifications of interest to architects. Leonard Peterson & Co., Inc., 1222–34 Fullerton Ave., Chicago, Ill.

PITTSBURGH-DES MOINES ALL-STEEL GRAND STANDS. An interesting 2-page folder showing photographs of a number of installations of this company, together with a few suggestions on the practical and economical use of this equipment. Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.

WARDROBES, ROLLING PARTITIONS, ETC. A series of booklets giving information and specification data on this type of equipment. Richards-Wilcox Mfg. Company, Aurora, Ill.

ROYAL METAL PRODUCTS. A number of 2-page folders covering steel folding chairs, movable desks, stools, etc. Royal Metal Mfg. Co., 1138 So. Michigan Ave., Chicago, Ill.

SHELDON LABORATORY FURNITURE. An attractive catalog of furniture for laboratories, home economics, and vocational schools, featuring a number of school-shop layouts. E. H. Sheldon & Company, Muskegon, Mich.

STANDARD ELECTRIC TIME SYSTEMS, A.I.A. No. 31-1-2. A 40-page booklet containing full information on electric time systems as well as specification data. **A.I.A. 35–c2. Bulletin 51.** An 8-page supplement on electrical educational equipment for physics, chemistry and biology laboratories. The Standard Electric Time Co., Springfield, Mass.

THE SOLAR SYSTEM OF WASTE DISPOSAL. A series of folders describing Solar waste receptacles and a new system of waste disposal. Solar-Sturges Mfg. Co., Melrose Park, Ill.

THE RED BOOK OF BUILDING MATERIAL. A carefully planned booklet including complete details for the specification of U. S. Gypsum sound and fire-insulation products, acoustical tile and plaster, etc. Several other booklets on controlled sound also available. U. S. Gypsum Co., 300 West Adams St., Chicago, Ill.

VOGEL SEAT ACTION AND FROST PROOF WATER CLOSETS, A.I.A. 29H22. Bulletin No. 1. Prepared especially for architects; illustrates and describes the installation of Vogel equipment. Joseph A. Vogel Company, Wilmington, Del.

VON DUPRIN SELF-RELEASING FIRE EXIT DEVICES, A.I.A. 27c5. A 159-page catalog, well illustrated, covering the complete Von Duprin Line of exit devices. Vonnegut Hardware Co., Indianapolis, Ind.

THE SANITATION OF SWIMMING POOLS, Technical publication No. 41. An interesting and instructive folder on the proper chlorination and sanitation of swimming pools. A very instructive reprint entitled "Swimming Pools and Other Public Bathing Places," is also included. Wallace and Tiernan Co., Inc., Newark, N. J.

W-C ARCHITECTS PORTFOLIO, A.I.A. File No. 35-b12. Statistical information with detailed drawings and technical data for Sterling Lifelong Blackboard. **W-C Time Tested School Supplies Catalog No. 15.** Ninety-six pages of information on school supplies with special reference and detailed specifications on Sterling Lifelong Blackboard and Hyloplate Blackboard. Weber Costello Company, Chicago Heights, Ill.

WELCH LABORATORY FURNITURE AND SUPPLIES. Catalogs covering thoroughly a complete line of furniture and supplies for the school laboratory. W. M. Welch Mfg. Co., 1516 Orleans St., Chicago, Ill.

WESTERN ELECTRIC PUBLIC ADDRESS SYSTEMS. A very interesting catalog featuring photographs of typical installations, together with a general explanation of the operation of these systems. A booklet on the 4-A Audiometer is also included. This should prove of more than ordinary interest to schoolmen. The Western Electric Company, 195 Broadway, New York, N. Y.

WESTINGHOUSE GENERAL CATALOG FOR 1931–32. An elaborate 1300-page catalog covering the entire Westinghouse line of electrical equipment. A veritable textbook in itself. Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

WILLIAMS REVERSIBLE WINDOW EQUIPMENT, A.I.A. No. 27c1. A new 20-page catalog giving complete and concise review of Williams Pivot Sash Equipment. The Williams Pivot Sash Co., E. 37th St. at Perkins Ave., Cleveland, Ohio.

SECTIONFOLD AND ROLLING PARTITIONS, A.I.A. No. 19e61. A 32-page portfolio featuring installation data on Wilson Partitions. The J. G. Wilson Corporation, 11 East 38th Street, New York, N. Y.

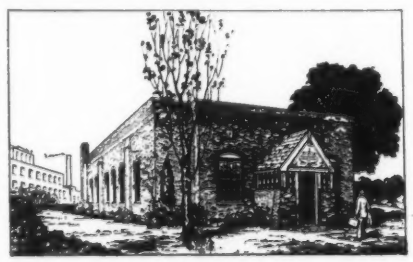
SCHOOL VENTILATION PRACTICE—YESTERDAY, TODAY AND TOMORROW. A treatise on heating and ventilation in schools with suggested code for schoolroom ventilation. Herman Nelson Corp., Moline, Ill.

A STORY OF HEALTH AND EFFICIENCY. A 3-page folder on the value of window ventilation. Ideal Ventilator Company, 160 Atlantic Avenue, Providence, R. I.

BUYERS NEWS

TRADE NEWS

Huntington Laboratories Open New Building. The Huntington Laboratories, Inc., of Huntington, Ind., makers of the well-known line of sanitary products, have announced the completion of a new office building and floor maintenance laboratory.



THE NEW HUNTINGTON LABORATORIES BUILDING

The building, which presents a very fine appearance, is completely equipped in the most modern way, and is handsomely finished with modern interior treatments.

A feature of the building is that there are eight types of flooring used. These enable the laboratory to keep a check on the usual traffic conditions and on the best method of cleaning and preserving these various types of flooring.

The new building will be a means of expansion to the firm and a direct help in meeting the needs of the school field in the way of beautiful and enduring floor surfaces.

New Steel Storage Cabinets for Schools. The Durabilt Steel Locker Co., of Aurora, Ill., manufacturers of steel lockers and storage cabinets, has just issued a booklet, entitled *Solving Gymnasium Storage Problems,* which illustrates and describes in a comprehensive way, the convenience, accessibility, and general practical usability of these steel storage cabinets. They are of two kinds, namely, No. 1 for sports and game equipment, and No. 2, for clothing, including street clothes, gymnasium clothes, and swimming suits. These cabinets are equipped with locks which makes for security. They may be had in a variety of widths, depths, and heights, and few or many may be purchased at one time or placed in a row as may be required. The cabinets may be had in a variety of colors, but as standard, the manufacturers finish them in olive green, or a rich shade of brown, which harmonizes with almost any interior trim.

American Portable Changes Name. The American Portable House Company, of Seattle, Wash., has recently changed its name to American Builders, Inc. The main office and factory is at 601 Alaska Street, Seattle.

Kewanee Boilers Approved by Architects and Engineers. The Kewanee line of steel heating boilers has recently been approved by an investigating committee of architects and engineers, which visited the plant of the firm and studied the quality of its product. The study was made to demonstrate the need of efficiency in a modern heating plant and to indicate the interest which the owner should have in giving preference to quality products.

Announce Film. The John C. Winston Company, of Philadelphia, Pa., has announced a new film, *Books —From Manuscript to Classroom,* which will be issued shortly. Copies may be obtained by writing to the Winston Company, at 1006 Arch St., Philadelphia, Pa.

PERSONAL NEWS

Mr. Bloch Promoted to Sales Manager. Mr. Nat. C. Bloch, who recently became Chicago sales manager for the Albert Pick-Barth Company, has been with the firm for more than fourteen years, and during that time has filled various positions of responsibility. He was general operating manager before he was appointed to his present position, and previously was in charge of various departments.

Death of Mr. Ambrose. Mr. Harry T. Ambrose, chairman of the board of directors of the American Book Company, which firm he headed for many years, died on November 22, at his home in Orange, N. J., at the age of 84.

Born in Fleming county, Kentucky, Mr. Ambrose spent his early business life in Cincinnati, where he entered the office of the American Book Company. In 1890, he accepted the position of secretary-treasurer, with headquarters in New York.

He became president of the company in 1900, but fifteen years later he resigned to assume the chairmanship of the board of directors. In recent years his association with the business had been in an advisory capacity and he had resided for a large part of the year at Winter Haven, Fla., where he had interests. He was a director of extensive business interests in East Orange and in Mexico.

Passing of Mr. Weary. Mr. E. D. Weary, president of the Athey Company, manufacturers of the well-known Athey accordian-pleated window shades and Athey metal weatherstrips, passed away at his home in Chicago, on Saturday, December 13, after an operation. Although he was almost 80 years old, Mr. Weary had been active up to a few days before his demise.

Mr. Weary was a pioneer in the weatherstrip business and was well known in the school field where his products were known and used. He was also president of the firm of Weary & Alford, architects, well-known designers of bank buildings. The Mariner Tower, Milwaukee, and the Ohio Savings Bank Toledo, are two of the most recent productions of the firm.

TRADE PRODUCTS

New Dudley Self-Locking Door. The Dudley Lock Corporation, of Chicago, Ill., manufacturers of Dudley combination locks, have just placed on the market a new keyless self-locking door especially adapted for school use.

The Dudley keyless self-locking door is the culmination of an efficiency ideal after ten years of experimenting. It is very simple both mechanically and in operation, takes only three seconds, three movements and a pull to open, and is in every way an efficiency lock. It represents a new era in locker efficiency, because it eliminates lost, forgotten, or misplaced keys, involves no keyboard nuisance, no master-key menace, and is proof against pilfering. It insures complete control — simple, direct, and easy — through the use of a master chart with a minimum of supervision.

The Dudley Company has also perfected a self-locking keyless padlock, which cannot be set, but leaves no doubt as to whether a locker padlock is really locked. The Dudley S-2-B is designed to lock automatically upon closing. It is keyless, self-locking, foolproof, and pickproof, and is built to withstand harsh treatment.

School officials and architects who are interested in the Dudley keyless lock may obtain complete information and prices upon request.

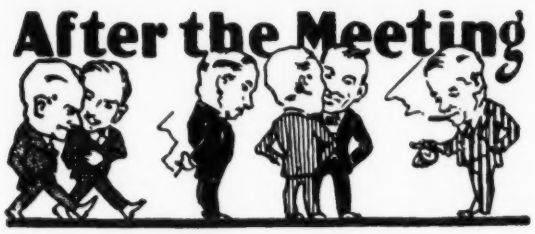
(Concluded on Page 166)

Guardians
of health
Exponents
of economy

NIBROC TOWELS

THE very finest and most economical paper towels you can obtain—they exceed all expectations! Their outstanding emollient and antiseptic qualities, together with their great strength and absorption will convince you. ¶ NIBROCS are made only from long, pure spruce fibres, in *brilliant white* and *golden brown.* One *single* NIBROC will thoroughly dry the wettest hands without falling to pieces. ¶ In school washrooms, NIBROCS are a necessary factor in maintaining wholesome conditions. They encourage children to wash their hands more often and eliminate the spreading of infectious diseases found on common cloth or roller towels. ¶ NIBROCS are lintless, and are served clean and fresh, individually from dust-proof, key-locked, enameled cabinets, which are loaned without charge. Write for generous supply of NIBROCS today.

BROWN Company
FOUNDED 1852
Portland, Maine



And the Class Laughed

Teacher, who had left the classroom for a minute, returned to find Tom behind her desk imitating her with utmost gravity.

"Are you teaching the class?" she asked severely.

"No ma'am," said Tom.

"Well, then," said Teacher, "don't act like a fool."

Give Dad Credit

Teacher (looking over Teddy's homework): "I don't see how it's possible for a single person to make so many mistakes."

Teddy (proudly): "It isn't a single person, teacher. Father helped me."—Pittsburgh School Bulletin.

Page Al Smith

Teacher: "And just think! One of you may be president some day. All of you who would like to be president, please rise." (All rose except little Willie.)

"Well, Willie, what's the matter? Wouldn't you like to be president?"

Willie: "Y-yes'm b-but I ca-ca-can't."

Teacher: "Why not?"

Willie: "Because-because—I'm a D-d-democrat."

An Old Favorite

The teacher said she wanted all the little boys and girls to be very, very still—so still that they could hear a pin drop. Very soon all were silent and motionless.

Suddenly an excited little voice cried out, "Now's your chance, teacher—let her drop!"

Modern Children

The pretty young kindergartener had been telling her pupils all about the winds, their power, different effects, and so on. "And, children," she went on, enthusiastically, "as I came to school this morning on the top of the bus something softly came and kissed my cheek. What do you think it was?"

"The conductor!" cried the children, joyously.

Teacher Wins

A pupil was having trouble with punctuation and was being called down by the teacher.

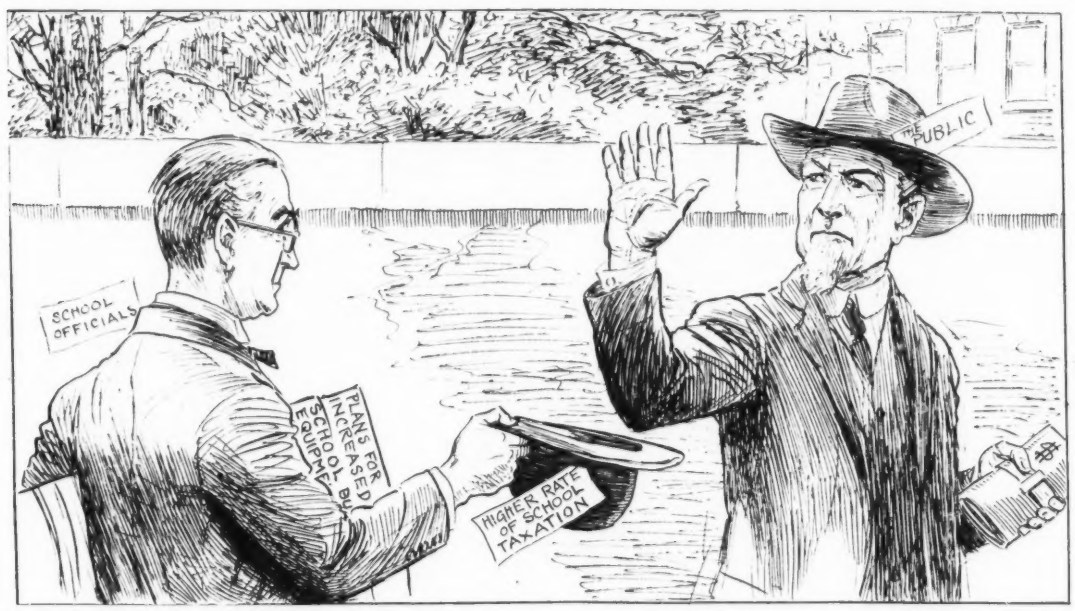
"Never mind, sonny," said the visiting school-board president, consolingly, "it's foolish to bother about commas. They don't amount to much, anyway."

The teacher then directed one of the pupils to write on the board this sentence: "The president of the board says the teacher is a fool." "Now," she continued, "put a comma after 'board' and another after 'teacher'!"—L. A. School Journal.

Natural Conclusions

A teacher of music in a public school was trying to impress upon her pupils the meaning of *f* and *ff* in a song that they were about to learn. After explaining the first sign, she said, "Now, children, what do you say; if *f* means *forte*, what does *ff* mean?"

"Eighty!" shouted one enthusiastic pupil.



PLANS FOR AN INCREASE IN SCHOOL BUILDINGS AND EQUIPMENT
FINE BUSINESS! HOW MUCH DO YOU WANT?
THE PUBLIC
SCHOOL ADMINISTRATION
AMERICAN SCHOOL BOARD JOURNAL
Harold Heaton

School Boards Can Find Support for School-Building Projects Which Are Carefully Planned and Properly Presented.

BUYERS' NEWS

(Concluded from Page 164)

Nelson System of Ventilation. The Herman Nelson Corporation, of Moline, Ill., has issued a booklet of 101 pages describing the Nelson system of ventilation. The system, which reduces to practice the newer science of ventilation as applied to school classrooms and similar spaces, employs the same general type of apparatus which has always characterized univent ventilation and which has been used in inventions which have made this possible.

The principal equipment used in the Nelson system is the Her-Nel-Co ventilator, which utilizes one or more of these machines, together with the required amount of auxiliary direct radiation. For the average classroom, one ventilator is used and the capacity is adjusted to properly ventilate any room seating 50 or less pupils. For larger rooms, two or more ventilators may be used.

The Nelson system is not limited to a specific type of equipment. The ventilator is a portable and self-contained machine especially adapted to school classroom use. The Magnavent, a quiet, high-duty fan-and-motor unit, may be employed in a combination with other equipment to apply the Nelson system of ventilation to auditoriums and other spaces where it is feasible to operate a number of ventilators.

School officials and architects who are interested may obtain complete information by addressing the firm at Moline, Ill.

New Tucker Folding Chair. The Tucker Duck & Rubber Company, of Fort Smith, Ark., manufacturers of the Peerless line of folding furniture, has just announced a new folding chair, which is adapted for a variety of uses and may be obtained at a very low price.

THE NEW TUCKER CHAIR

The new Tucker folding chair is light in weight, constructed of beech, strongly built, and rigid. The chair may be obtained in a natural finish for assembly purposes, or in colors — lacquered red or green, with black seats, with or without pads. The size of the seat is 11 by 13 in., and the size of the chair, when folded, is 34 in. long, 15 in. wide, and 1¾ in. thick. A special advantage is the fact that the chairs when not in use may be folded and stored in a small space.

The Tucker Company manufactures the well-known Peerless line, including folding cots, chairs, stools, and recliners. A copy of the complete catalog describing the Peerless line of folding furniture may be obtained by any school official upon request.

New Grade Names for Oak Flooring. The Oak Flooring Manufacturers' Association, Memphis, Tenn., has announced a change in the grade names of oak flooring, which became effective January 1. The new grade names will be known as: Quarter sawed — clear, sap clear, and select; plain sawed — clear, select, No. 1 common, and No. 2 common.

The change in names was made to more fitly designate the special qualities and particular uses of various grades of lumber.

New Binocular Microscope Model IAABM. The E. Leitz Company, Inc., of New York City, has announced a new binocular research microscope, Model IAABM, which involves a new type of binocular prism body for convenience during continued observation.

The binocular body tube consists of a housing containing a prism system, the casing being provided with two parallel ocular tubes for paired oculars. The ocular tubes are set at an angle to permit the observer to sit in a natural position. The tubes are fitted to a slider, permitting adjustment to interpupillary distance and reading this distance off a millimeter scale. The binocular body tube is fastened to the microscope stand by sliding it into the rack and pinion track, and locking it in place by a lever with eccentric bearing. A micrometer screw serves as a fine adjustment, and a divided micrometer head with verniers permits accurate measurements of the thickness of specimens.

Complete information and prices may be obtained by any school official, or instructor, upon request.

A fire company of the 40's examining their new horse drawn engine

Protecting Lives and Property

MUTUAL life insurance companies have outstanding over ninety million policies. Practically everyone who carries any considerable amount of life insurance has one or more mutual policies.

In the field of fire insurance, many strong, seasoned legal reserve companies operating on the same basic mutual principles, offer policyholders all of the traditional and tried advantages of the mutual plan of insurance.

Your interest is the sole concern of mutual fire companies. As a policyholder you benefit directly by anything that benefits your company. There are no stockholders in a mutual corporation.

Mutual fire management has effected enormous savings through fire prevention effort; through conservative and economical management.

These savings have been passed on to policyholders in dividends—millions of dollars annually.

Every property owner should inform himself about the operation and principles of mutual fire insurance—its record of 178 years of service—its savings to policyholders.

A booklet will be sent on request. There is, of course, no obligation involved. Address Mutual Fire Insurance, Room 2202-C, 180 North Michigan Avenue, Chicago, Illinois.

An Unparalleled Record

75 leading, legal reserve companies under State supervision constitute the Federation of Mutual Fire Insurance Companies. The oldest Federation company was founded in 1752. Five others are more than 100 years old.

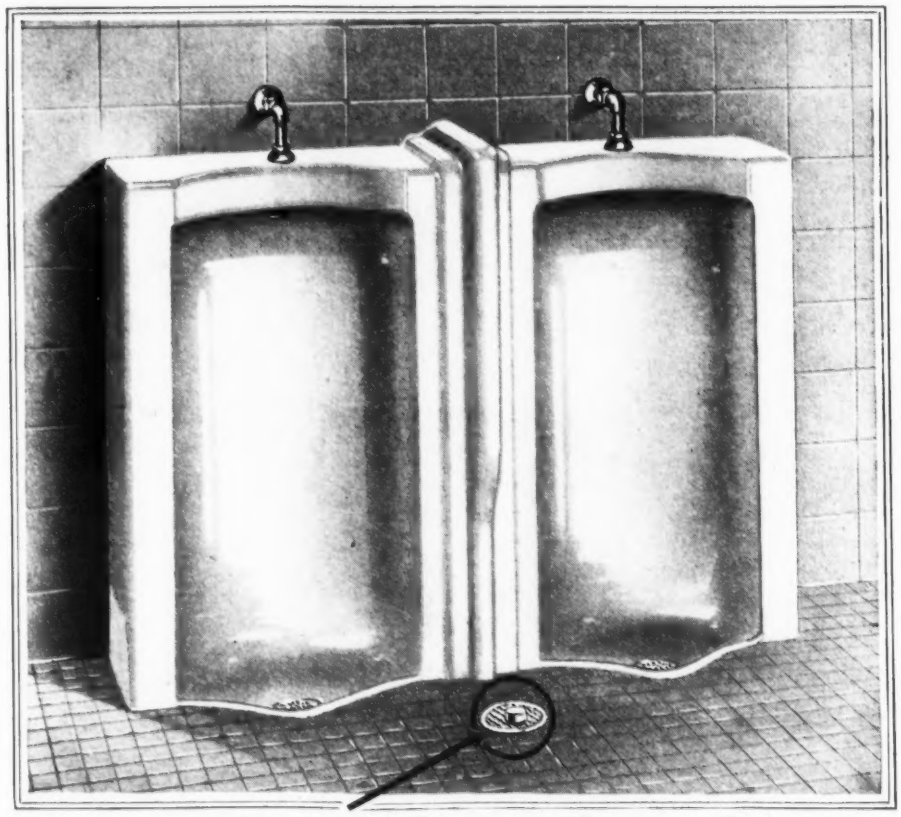
Of the remaining companies—

9 are between 75 and 100 years old
10 are between 50 and 75 years old
30 are between 25 and 50 years old
20 are between 10 and 25 years old

The Federation companies are protecting property to the extent of six billion dollars—have assets in excess of ninety million dollars—have returned to policyholders savings of more than one hundred and thirty millions of dollars.

Mutual Fire Insurance

FEDERATION OF MUTUAL FIRE INSURANCE COMPANIES



Urinal stalls C15506, equipped with Water Controlled Foot Operated Flushing Valves

Water saved...and nothing for the hands to touch

TWO outstanding merits in school use are offered by urinal stalls equipped with the Crane Water Controlled Foot Operated Flush Valve.

1. Water is conserved, for instead of flushing periodically whether in use or not, the urinals are flushed at need.

2. Contamination is eliminated, for the hands never touch anything... step on the floor push button and the flush is accomplished.

Batteries of two urinals may be installed with the flushing button in the floor between. Batteries of three may have two buttons. In each case, the self-closing auxiliary floor valves connect with one water controlled flushing valve that serves all the urinals in the battery.

The self-closing auxiliary valves, sure and positive in action, are located in a cast iron box built into the floor, water tight and protected from all chance of abuse. They can be removed, repaired, or replaced without disturbing the floor.

Through the whole line of Crane plumbing and heating equipment for schools, the same ingenious working out of every detail, in the light of knowledge of conditions to be met, is found. Crane plumbing specialists will gladly work with your architect and building committee to select advantageous, dependable, economical materials exactly suited to your school's needs. Call on them.

Valves CRANE *Fittings*

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO

NEW YORK OFFICES: 23 W. 44TH STREET

Branches and Sales Offices in One Hundred and Ninety-six Cities

Right

With Up-to-Date Floor Cleaning Methods

January is more than just another month . . . more than the beginning of a new year. In many cases it marks the beginning of a new determination to improve methods—and service—and often the beginning of a new budget.

Make sure your resolutions for the year include a modernization of floor-cleaning methods. And make sure your budget provides for them.

The time is rapidly coming when a school which still uses the hand-and-knee scrubbing, or mopping, or weighted brush polishing, will be considered as out-of-date as the one using old-fashioned desks or obsolete textbooks.

Schools should be the cleanest buildings in the community. The FINNELL Scrubber-Polisher will keep them so. Such floors will exert a definite influence upon both teaching staff and pupils, encouraging cleanliness and orderliness of both person and surroundings, virtues which modern education should include.

The FINNELL scrubs and polishes—electrically, exerting from 35 to 60 pounds pressure on the brushes (depending upon the size of the machine). Clean water is provided for every square inch of floor space and the brushes dig down beneath surface dirt until every particle is routed, even from between the cracks and crevices.

Why not investigate now and quit wasting time and money on old-fashioned methods which get floors only half clean? Eight models of the FINNELL Scrubber-Polisher, together with auxiliary equipment, permit twenty different systems. Let us make a survey of floors in your schools and recommend the system best adapted to your needs. Address: FINNELL SYSTEM, INC., 801 East Street, Elkhart, Indiana.

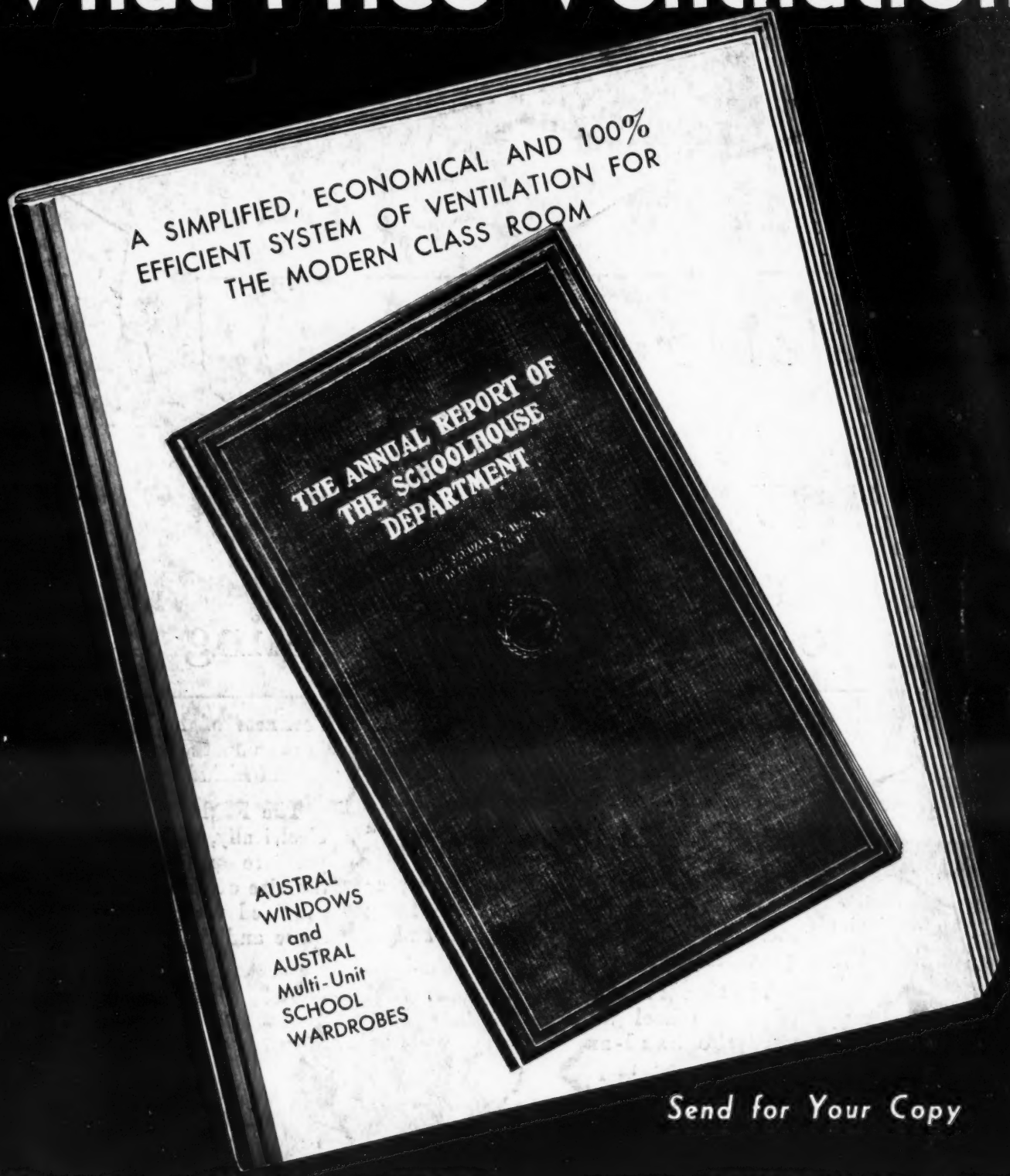
The New FINNELL Combination

Scrubs faster than one can mop. Cleaner floors at lower cost than mopping. Scrubs and picks up water in one operation.

FOR HOMES, TOO.

FINNELL for home use. Twin disc. High speed. Ample power. Price anyone can afford. Waxes, polishes, finishes, scrubs,—wet or dry. Sold on terms.

What Price Ventilation?


A SIMPLIFIED, ECONOMICAL AND 100% EFFICIENT SYSTEM OF VENTILATION FOR THE MODERN CLASS ROOM
THE ANNUAL REPORT OF THE SCHOOLHOUSE DEPARTMENT
AUSTRAL WINDOWS and AUSTRAL Multi-Unit SCHOOL WARDROBES

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This booklet and REPORT of the BOSTON SCHOOLHOUSE DEPARTMENT tell the story of NATURAL VENTILATION, the story of a tremendous ECONOMY. Here is the latest romance of our fast-stepping era of building —THE CONTROL OF FRESH AIR.

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